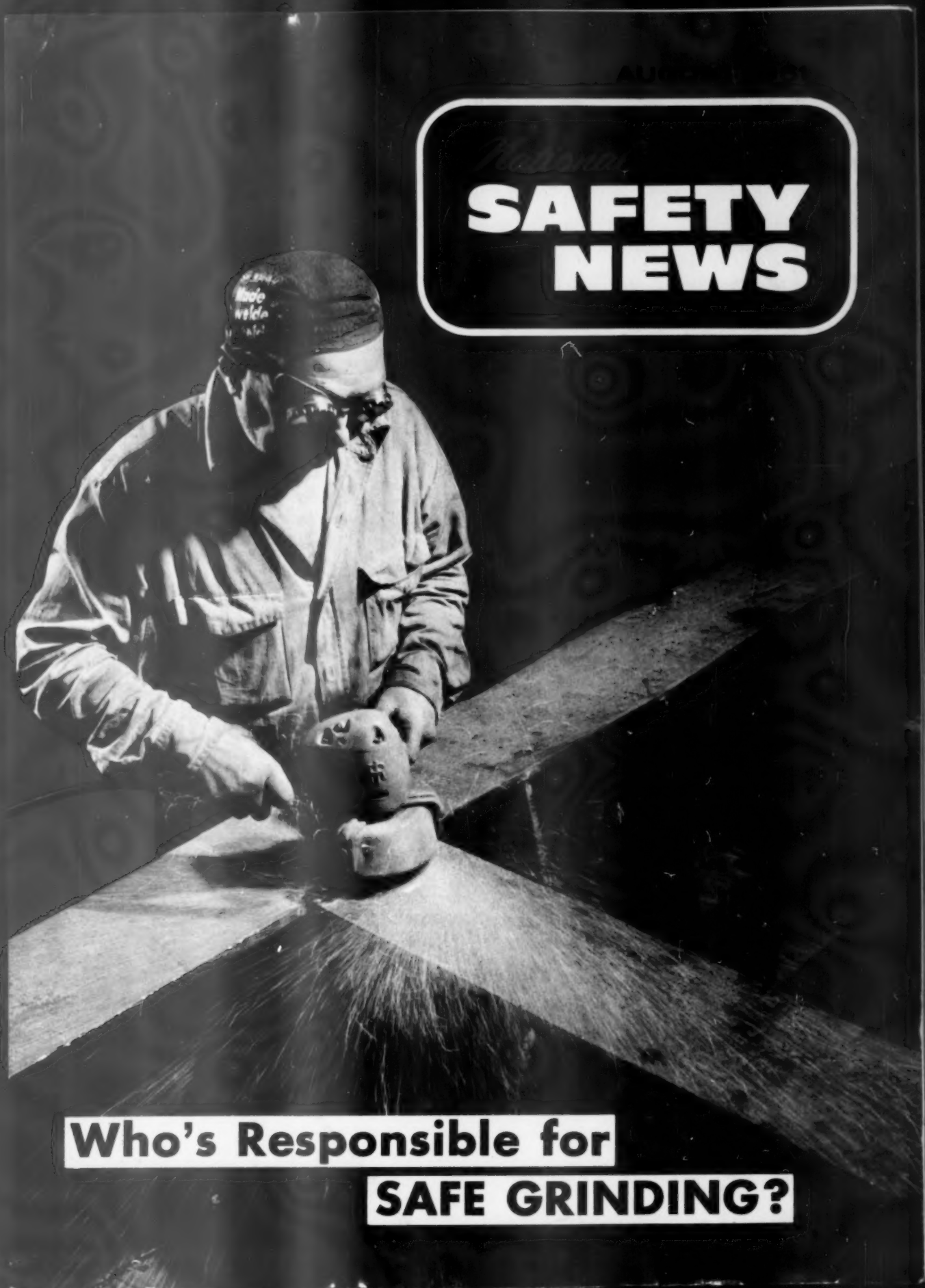
National SAFETY NEWS



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Who Needs Three Heads...

to decide that SAFETY SHOES are a good deal?

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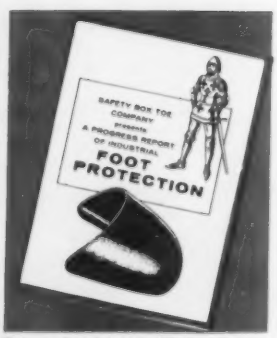
Do you keep them well informed, aware of the advantages, the low-cost maximum protection of safety footwear?

Foot protection should be an integral part of your safety program. *You* are the key man in making it so.

Help prevent the unbelievable loss of time and money due to foot accidents. Stress the low-cost foot protection of shoes with safety steel toes in your program. They still cost less than ordinary street shoes.



Write today for your illustrated copy of A PROGRESS REPORT OF INDUSTRIAL FOOT PROTECTION.

Safety Box Toe Company

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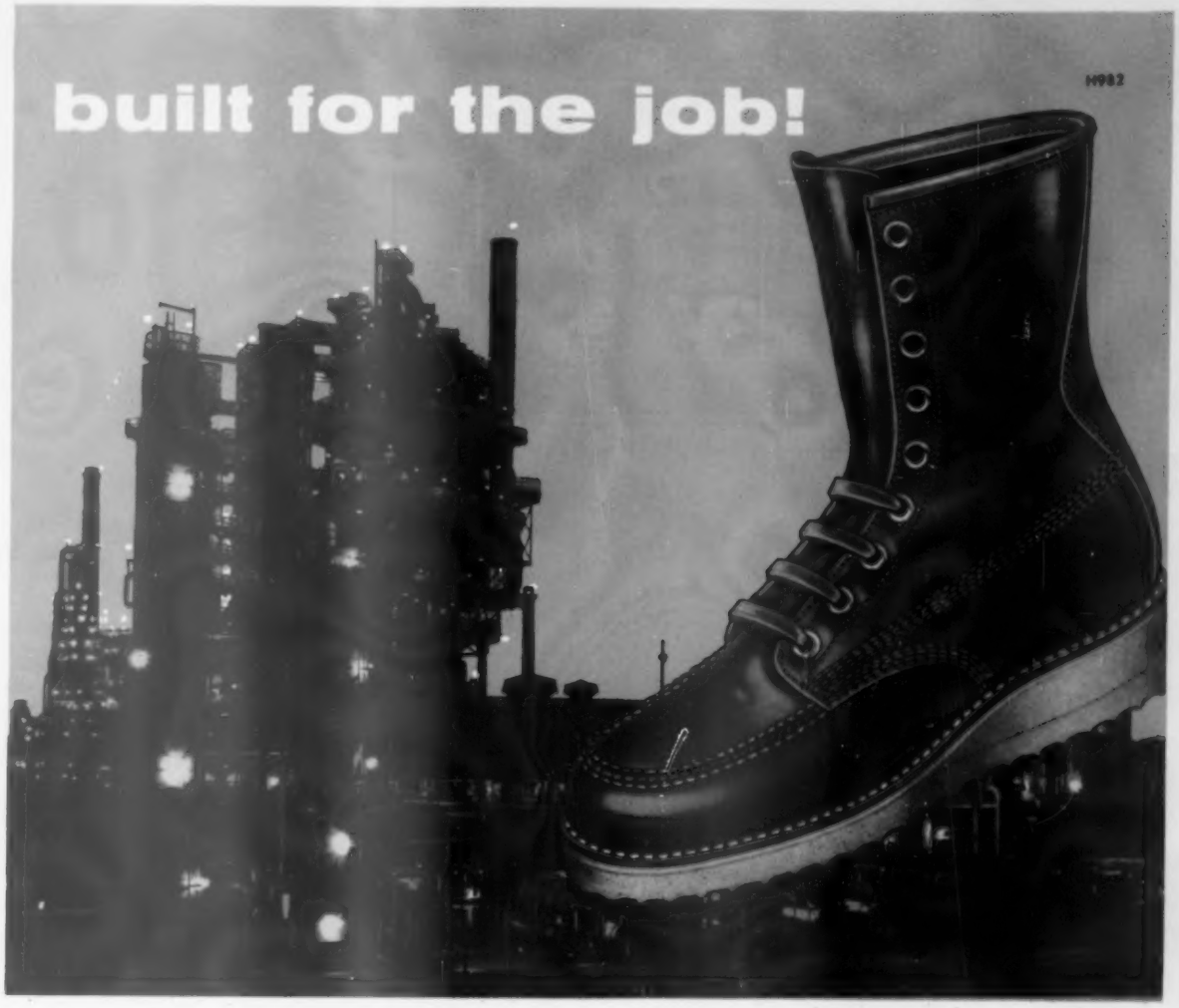
Manufacturers of 19 different styles of safety steel toes
AUSTEMPERED for maximum foot protection

CIRCLE 1 ON READER CARD



You name the use . . . HY-TEST can fill it with the largest and most complete line of SAFEty BOOTS ever offered. Each style is designed to give the wearer the kind of protection, comfort and features he expects, including the exclusive Anchor Flange Steel Box Toe. Be prepared for the season ahead . . . order today . . . HY-TEST SAFETY SHOES, Division, International Shoe Co., 1509 Washington Ave., St. Louis 66, Mo., 2224 N. Tenth St., Philadelphia 33, Pa.

H982 (above)—Sorrel tan Quilon 9" boot; cushion insole; Neoprene Crepe wedge sole, heel.

H294 (left)—Brown insulated 8" boot; cushion insole; Neoprene Nylon sole; Resist-Oil heel.

H291—Brown 8" boot; oil-resistant reinforced double sole, heel.

H681—Brown Syl-Mer 8" waterproof type molded construction boot; Resist-Oil Grit sole, heel.

H682—Brown Quilon 8" molded construction boot; Resist-Oil Grit sole, heel.

H950—Tan Quilon 8" boot; cushion insole; Chip-Chek Resist-Oil Grit sole, heel.

H954—Brown glove 8" boot; Neo-Cord heavy-duty sole, heel.

H956—Spark-resisting black retan 10" boot; Resist-Oil sole, vulcanized heel.

H964—Cush'n-Guard instep protector black rosite 8" boot; Resist-Oil sole, heel.

H987—Black Hy-Climber 9" boot; Neo-Cord sole, logger-type heel; long counter, wide steel shank.

H989—Brown glove 10" boot with elastic gore top; Chip-Chek Resist-Oil sole, heel.

H991—Tan 8" boot; cushion insole; Resist-Oil Cellular Crepe Grit sole, heel.

H992—Tan Cush'n-Guard instep protector 8" boot; cushion insole; Resist-Oil Cellular Grit sole, heel.

H994—Black Quilon 7½" Wellington pull-on; non-metallic Chip-Chek Grit sole, vulcanized heel.

H995—Tan 7½" Wellington pull-on; non-metallic Chip-Chek Resist-Oil Grit sole, vulcanized heel.

H997—Brown glove 8" lace-to-toe boot; heavy-duty Resist-Oil (Neoprene) sole, heel.

H998—Black 10" pull-on boot; heavy-duty Neo-Cord oil-resistant sole, anti-slip logger heel.

H999—Black 10" engineer's boot; heavy-duty Resist-Oil (Neoprene) sole, heel.

HY-TEST Safety Boots

CIRCLE 74 ON READER CARD

National SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

VOL. 84, NO. 2 AUGUST 1961

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NATIONAL SAFETY COUNCIL

Chartered by the Congress of the United States

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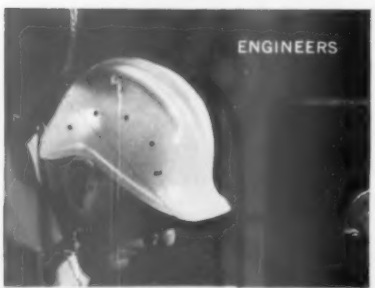
THE COVER

Worker finish grinding weld beads with a portable pneumatic grinder. He wears rugged cup goggles. This portable grinder is equipped with a substantial and efficient metal guard. (See Article, "Who's Responsible for Safe Grinding?" on page 26 of this issue.)

40,000 copies of this issue were printed

NEW BULLARD FEATHERWEIGHT BUMP/CAP

INDUSTRIAL SAFETY EQUIPMENT



Here's the ideal close-quarters head protection to guard against scalp lacerations and contusions — the "hidden hazard" that's costing many industries thousands of lost man hours daily.

- SO STURDY AND SCIENTIFICALLY DESIGNED that it completely protects top, back and sides of head from all bumps.
- SO INEXPENSIVE that this money-saving head protection may now be supplied for all close-quarters workers.

The new Bullard Bump/Cap is made of special featherweight Estherene which will not chip, crack or fracture and is resistant to both heat and cold. Colors: white and yellow. Sizes: S, 6⅛ to 7¼; L, 7⅜ to 7⅞.

Call your Bullard Sales Engineer today for full details and demonstration . . . or write E. D. Bullard Company, Sausalito, California.

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CIRCLE 75 ON READER CARD

VOICE of the READER

Likes "Off-Job Jeopardy"

NEW YORK. We would like your permission to reprint in the *American Association of Industrial Nurses Journal* Dr. Wilford E. Park's article, "A Physician Examines Off-Job Jeopardy," which appeared in the May 1961 issue of NATIONAL SAFETY NEWS.

If we receive your permission we will write Dr. Park requesting his. The usual credit line to your publication will, of course, be given.

(MRS.) KATHRYN M. DOBBY, R.N.
Editor
American Association of Industrial Nurses Journal

Seeks Shock Hazard Data

WATERTOWN, MASS. If available, I would appreciate your sending to me a copy of the July 1960 issue of NATIONAL SAFETY NEWS.

I believe this issue features an article on "Electrical Safety in the Home" in your *Off the Job* column.

I would also appreciate your permission to reprint the article for distribution to our employees.

– ROBERT W. FLACK
Safety Director
United Parcel Service

Praises A-V Issue

LEOMINSTER, MASS. Congratulations! Your June issue of the NATIONAL SAFETY NEWS was one of the most useful and informative publications your office has produced. Safety men need more promotional and audio-visual information such as appeared in your June edition. Keep it up.

– THOMAS H. SCHUMANN
Director of Industrial Relations
The Mead Corp.

Probes Ad Policy

LEBANON, PA. The enclosed page is from a copy of your issue as you can see. As an indication to you that your magazine is well read, this page was brought into my office by an employee of our cleaning department. Upon handing it to me he said, "Pick out the hazard." It slowed me up for a minute—the page coming from the NATIONAL SAFETY NEWS—would they print a picture with an exposed hazard plainly visible to all who saw the ad? Righting myself and taking a second look I saw what he wanted me to see.

You show in the picture a pickle operator removing a load from a vat of hot acid, standing adjacent to it and not wearing any protective equipment: namely, face shield, neoprene gloves, and either coat or apron. In our plant no one operates in the pickling room without wearing the proper safety equipment. Our men know this and, of course, this fellow spotted it.

We have some very interesting discussions at our bi-weekly safety committee meetings on topics taken from your magazine.

– PETER GAMBER
Safety Director
Lebanon Steel Foundry

One of our continuing problems is the advertisement submitted by a client who does not know proper safety procedures. We screen these ads before they are inserted, but some are borderline cases. It is entirely possible that this ad was questioned, and passed on the condition that the advertiser would change it in the near future. Our present advertising policy says "advertising copy and illustrations should conform with accepted safe practices." Other provisions of the policy are "Claims which are beyond proof should be avoided, such as 'absolute protection,' 'one-hundred per cent safe,' etc.; advertisers should confine their statements to the merits of their own products, and should avoid comparisons with the products of other manufacturers; in using statistics, the source should be given." The new revised policy is being sent to all new advertisers and to prospective advertisers. Old advertisers will also receive the new policy as new contracts are received.

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NATIONAL SAFETY COUNCIL

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Gamewell FLEXALARM *interior* fire alarm signal systems offer the same high standards of reliability. They can be planned as part of complete fire protection for *any* building: institutional, commercial or industrial — public or private.

Gamewell will be happy to show you how you can plan maximum protection at minimum cost — for new construction, expansion or modernization. Safety is everybody's business . . . our profession.

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BLISS Gamewell®

FIRST... WHEN SECONDS COUNT

CIRCLE 76 ON READER CARD

Another new way to reduce safety equipment inventory by Willson

AN ESB PRODUCT

exclusive Kwik-Klip Headgear

adapts faceshields, welding helmets, goggles to any cap

Now workers can attach face protectors over *any* make of hard cap . . . in seconds . . . remove or change them, right on the job. Molded nylon hooks on Willson's new Kwik-Klip headgear clasp over cap brim (above) . . . *eliminate alterations* to cap shells. Spring tension holds face protector securely. To remove, wearer just spreads hooks and lifts. Swivel action permits face protector to be raised over cap. Universally reusable—reduces inventory requirements. Three styles. Ask your Willson distributor for details, or write for Bulletins W6105, W6106.

WILLSON®

CIRCLE 4 ON READER CARD

Willson Products
A Division of
The Electric Storage Battery Co
Reading, Pennsylvania
In Canada: Safety Supply Company

DIARY OF A SAFETY ENGINEER

If it's true we learn by our mistakes, this pink-cheeked young graduate will soon be the smartest safety man who ever came down the pike

PROBLEM CHILD

Fiction by BILL ANDREWS

I'M NOT QUITE SURE whether I've run out of luck or patience or common sense. But I've certainly run out of at least one of these three things.

In a quarter-century-plus of safety work, I've seen a lot of safety men. Some of them were able. Some of them were intelligent. Some of them had a lot of character and courage.

There were others who lacked one or another of these qualities in varying degrees, and I've seen catastrophic failures and weary lives lived by men who just weren't quite masters of their profession.

Since I lived in the knowledge of this difference in men, I've always tried hard to select assistants with a promise of durable ability – not just quick, flashy brilliance, certainly not men who already were masters of the profession, but young men who would and could learn and apply what they learned.

I could brag (as a matter of fact, I *have* often bragged) that I've never chosen a youngster who proved unworthy of the time and effort I put into his training. Two of my former assistants are now heading big safety programs of their own, and several others have made real contributions to industry.

The two assistants I have here at the Project are gems. Lee and Bert are as different as night and day. Yet each man is competent and valuable.

I suspect I had built up a feeling that my judgment in the selection and training of assistant safety engineers was infallible.

But now I'm beginning to wonder!

Last spring, when I got an OK to hire a third assistant, I wrote my favorite professor at Tech, my alma mater, telling him my needs. I got back the usual selected set of resumés on boys the professor considered promising and available. I didn't worry too much about the cautious footnote Professor White put on his covering letter: "This isn't one of our better lots."

I knew the professor had his dour periods, when he reflected on the discrepancy between the young faces looking into his in class and the memories of past classes whose appearance has improved as memory dims.

The resumés seemed a normal selection, and I whittled the set down to three men I thought worth writing to. One of them, my first choice, replied that he already had a job in the field. The other two wrote in some detail to express their interest in my job and to offer more details about themselves.

There was no comparison between the two letters. One was written in stilted language and rather badly typed. The other had a forceful ring and a good presentation of the information I wanted.

What could I do but call in the writer of the second letter for an interview? Joe Burton is a well-built, apparently well-adjusted lad of 22. He treated me with a mixture of deference and man-to-man equality that I liked.

Before I actually hired him, I called Professor White. He said he was glad I liked the boy and hoped he would work out. But there was something in his voice that suggested a "yes – but" reaction.

I asked him to tell me frankly if there was any reason for not hiring Joe. Professor White answered quickly (perhaps too quickly), "No, not at all! He's done quite well in most of his courses. A lively, articulate boy. He might do very well. No, if I had any doubt, it was about why you passed over Louis Jerris."

I explained Jerris had written a bad letter, and Professor White remained silent. So I hired Joe, and he reported for work the first of August.

Certainly, four days is not enough to judge a youngster on. But that boy has managed to compress into a few days more blunders than anybody I've ever seen in the safety field!

Tuesday, I had Lee work with him for several hours, showing him the record setup, the statistical pic-

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← CIRCLE 4 ON READER CARD

news briefs

Pointing is crude

When anyone has occasion to point to something in moving machinery, it is wise to use a narrow-beam flashlight rather than a finger or a wood or metal pointer. The flashlight case should be nonmetallic. The flashlight beam is preferable for pointing to electrical conductors, too.

Repairs without radioactivity

A radiation safety officer discovered a serious industrial hazard from the "dusting off" of radioactive luminous paint during repair of watches and instruments. The operation was made safe by changing work procedures so the contaminated articles are now cleaned inside a dry box, and then sealing the remaining paint under a coat of transparent plastic. If the equipment is too large for a dry box, a larger room is used and the operator wears a complete set of protective clothing and a respirator.

Loose talk

Some industrial physicians believe the word "toxic" is being used too loosely. Chemicals that do no more than irritate the skin or upper respiratory tract are referred to as toxic. The word is applied to chemicals which under some conditions could be toxic but which usually only cause surface irritation, not systemic poisoning. It is believed that for scientific and legal reasons the term should be used with greater care.

For the ladies

The Illinois Department of Public Health recommends that pregnant women should: be transferred, if necessary, to lighter or a more sedentary type of work; not be employed between 12:00 midnight and 6:00 a.m.; not work more than eight hours a day or 40 hours a week; have at least two 10-minute rest periods during the shift; not do jobs that require strain, bodily balance, or involve vibration; not be exposed to lead and mercury compounds, aniline, benzol, toluol, nitrobenzol or other nitro compounds, carbon tetrachloride, ionizing radiation, or other toxic substances.

Numb thumb

An employee working on his roses at home reported an off-the-job injury caused by misuse of an aerosol spray. He put his thumb beyond the nozzle to get better leverage on the valve. The thumb turned yellow, and he thought it was the insecticide. The first joint wouldn't bend, though, because it had been frozen solid by expansion of the propellant gas. Several minutes under running water restored sensation to the thumb, but it took weeks for the last of the severe frostbite to disappear.

To bike, men!

An operation that was split by a highway had some difficulty in getting its fire brigade together when an alarm was sounded. Several tests were made to find the quickest way to move the fire fighters from one side of the road to the other. The unorthodox method of bicycling was found to be the most efficient.

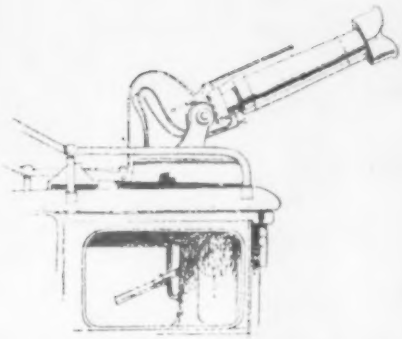
Coffee break precedent

A state supreme court ruled that a woman who was hurt on her coffee break was entitled to a workman's compensation award. The woman slipped on an icy sidewalk while going out to buy coffee. The reasoning of the court was that the coffee break was a condition of employment, so the injury was incurred in the course of the employment.

"We're just buffs"

A factory, obviously in dire need of automatic alarm equipment, suffered severe damage because employees watching the fire failed to turn in an alarm. When questioned, they answered that the fire brigade was responsible for fires ". . . and we thought they knew what they were doing."

Jim Saul



ROCKWOOD DELIVERS MORE FIRE FIGHTING POWER—

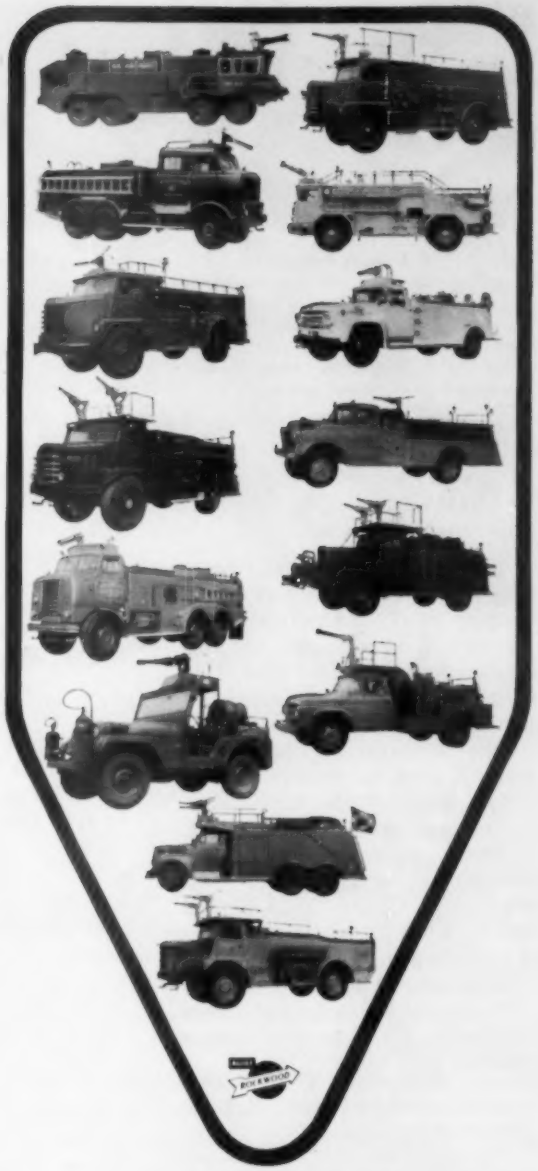
extinguishes faster

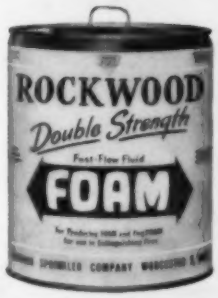
Rockwood specialty FOAM Fire-Truck equipment provides greater fire-fighting punch to meet any situation fast and make manpower more effective! Why? Because it adapts quickly to changing conditions . . . hits harder and faster.

There's volume and versatility to spare in Rockwood turret nozzles. They are immediately adjustable to fight fire four ways: with FogFOAM — Solid FOAM Stream — WaterFOG — Solid Water Stream.

And Rockwood FOAM Fire Truck Proportioning Systems provide close control of FOAM liquid proportioning *automatically* — another vital step in the efficient use of manpower.

Rockwood Handline, Ground-sweep, Under Truck Nozzles and custom designed specialty parts combine to round out the complete line of FOAM equipment . . . the most advanced, most effective tools for fire protection, regardless of your particular needs. For details, write Rockwood Sprinkler Company, Portable Fire Protection Department, 462 Harlow Street, Worcester 5, Mass. Distributors in all principal cities. Rockwood Sprinkler Company, A Division of The Gamewell Company, A Subsidiary of E.W. Bliss Company. *Rockwood engineers water . . . to cut fire losses.*





ROCKWOOD

PORTABLE FIRE FIGHTING EQUIPMENT

CIRCLE 5 ON READER CARD

Fire Tips for The Safety Man

By MARSHALL E. PETERSEN

Marshall E. Petersen is the consultant fire protection engineer for the National Safety Council's Industrial Department. He has a B.S. degree in safety and fire protection engineering from Illinois Institute of Technology. Petersen is a member of the American Society of Safety Engineers and the Greater Chicago Safety Council. Before joining the NSC staff, he was supervisor of safety and fire protection, Allied Chemical Corp.; industrial hygienist, Illinois Department of Labor; and safety engineer, Argonne National Laboratory.

IIT Offers Fall Fire Courses

The Fire Protection and Safety Engineering Department of Illinois Institute of Technology will offer the new fire protection program, "Fundamentals of Fire Protection" in the evening school session starting this September.

The courses will begin on Sept. 18 and will continue through Jan. 27, 1962. They will be taught under the supervision of Prof. Gerald L. Maatman, department director. Registration will be Sept. 11-12 at the Technology Center, 3300 S. Federal St., Chicago.

Courses include:

Industrial Fire Hazards I. (Hazards of flammable liquids, gases, combustible solids, dusts, chemicals, and explosives, with emphasis on their industrial applications.) Wednesdays from 6:20 to 8:00 p.m. W. G. Labes, instructor.

Fire Protection Extinguishing and Detection Systems. (Lectures and laboratory demonstrations on types of automatic extinguishing and detection, with emphasis on automatic sprinkler equipment.) Tuesday from 6:20 to 9 p.m. Gene Dymek, instructor.

Fire Protection and Building Construction. (Fundamentals of fire-safe construction, fire resistance and flame spread tests, and building materials. Emphasis on life safety features.) Thursdays from 6:20 to 8:00 p.m. Gerald L. Maatman, instructor.

Fire Resistance of Prestressed Concrete

Increased testing of prestressed concrete building components during recent years has furnished data indicating this product can be designed to provide any required degree of fire resistance.

Fire resistance of prestressed concrete is affected principally by three factors: concrete cover over the prestressing steel, size of the member, and degree of restraint.

Tests conducted at the new fire research laboratories of the Portland Cement Association in Skokie, Ill., indicate fire endurance for prestressed concrete may be improved by increasing the cover or by providing restraint in construction.

The amount of restraint required appears to be relatively small. Fire tests on duplicate specimens of prestressed building members have given almost identical results, indicating performance is predictable.

The Underwriters' Laboratories' branch at Northbrook, Ill., has conducted a number of fire tests on prestressed concrete slabs as well as on joist-type members. UL provides 2-hour fire-resistance label service for most double-tees and channels produced in this country.

The basis for label service is a series of tests on double-tees sponsored by the Prestressed Concrete Institute. Most double-tee units are relatively small in cross section, and larger members will qualify for higher ratings.

Six tests have been conducted successfully on flat, hollow-core sections at Underwriters' Laboratories. These have qualified for at least 2-hour label service. None failed structurally when subjected to the American Society for Testing Materials standard fire test.

Additional tests on double-tees and on post-tensioned beam-and-slab construction have been performed at the Fire Prevention Research Institute, Gardena, Calif.

A task committee of the Illinois Section of the American Society of Civil Engineers has recommended tentative fire resistances for prestressed concrete from 1 to 4 hours. Their recommendations are dependent on concrete cover over the prestressing steel, and the size and shape of the member.

Flammables Equipment Deserves Proper Care

Safety cans, dip tanks, drum fittings, wash tanks and other flammables handling equipment deserve the same inspection and preventive maintenance care that production machinery receives.

All flammables handling equipment has functional parts, and malfunction must be prevented. Most such equipment has gaskets and seals. These must be kept intact and in good shape.

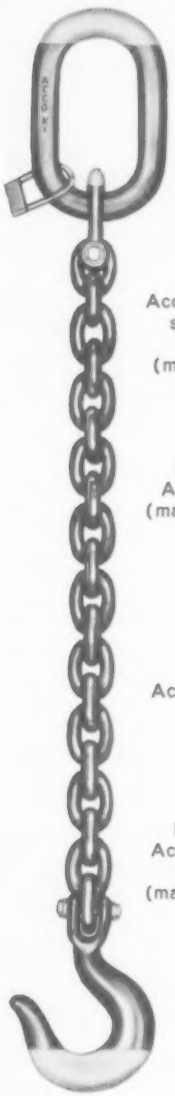
Even the best equipment can go wrong and fail to perform its safety functions if not regularly inspected and carefully maintained:

1. Some dispensing cans are fitted with flame arrestors which can be unscrewed. Persons not understanding the function of these might damage or remove them.

2. Filler and spout caps are fitted with special leak-resistant gaskets. If these should be damaged or do not seat properly, the can may leak if it is accidentally knocked over, spilling the flammable liquid.

3. Cap linkage assemblies are subject to damage through careless handling, and may no longer close properly, presenting an obvious hazard.

HOOKS HOOKS HOOKS



Accoloy drop-forged shaped section Masterlink (magnaflux tested)

Drop-forged Accoloy Kupler (magnaflux tested)

Accoloy 125 chain

Drop-forged Accoloy KUPLEX Hook (magnaflux tested)

NOW... Five Types to Choose from with Locally-Assembled KUPLEX Sling Chains!

KUPLEX... the fastest sling chain service ever... now offers a complete line of hooks to answer any or all of your lifting requirements. There are five types: sling... handle... safety ... grab... foundry... and they're available today from your nearby Authorized American Chain KUPLEX distributor. He's the man who can assemble and deliver KUPLEX Slings to your plant or job site in 24 hours. And while his service is fast, the slings he delivers will be expertly assembled from matched components specifically designed and engineered for use with other KUPLEX parts. Each component is made from heat-treated Accoloy steel and proof-tested at twice working load limits... a fact attested to by the certificate which the distributor gives you with each KUPLEX sling you buy.

Get the hooks you need and the sling chains you want, when you want them, from your KUPLEX distributor. He can supply single, double, 3-leg and 4-leg slings in six different chain sizes ($\frac{1}{2}$" through $\frac{7}{8}$") assembled from components carried in stock. If you don't know his name, contact us at York, Pa.

KUPLEX ACCOLOY Sling Chains

ACCO

American Chain Division · American Chain & Cable Company, Inc.

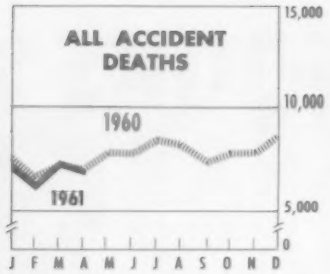
Bridgeport, Conn. Factories: *York and *Braddock, Pa., *San Francisco, *Chicago (Melrose Park), Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore. *San Francisco

Indicates Warehouse Stocks

CIRCLE 6 ON READER CARD

THE ACCIDENT BAROMETER

Prepared by the Statistics Division
National Safety Council



THE NATIONAL ACCIDENT FATALITY TOLL

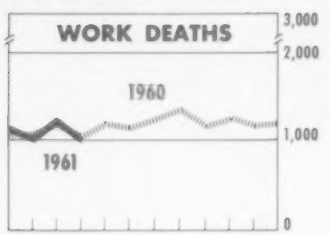
	April			Four Months		
	1961	1960	Change	1961	1960	Change
Total	7,000	7,200	− 3%	27,800	28,800	− 3%
Motor-Vehicle	3,050	2,960	+ 3%	10,780	10,630	+ 1%
Public (except M.V.)	1,150	1,200	− 4%	4,000	4,300	− 7%
Home	2,000	2,200	− 9%	9,600	10,400	− 8%
Work	1,000	1,050	− 5%	4,250	4,300	− 1%

WORK INJURIES

21 NATIONAL SAFETY COUNCIL CONTESTS

Disabling Injury Frequency Rates

	1961	1960	Change
April	6.33	6.69	−5%
Four Months	6.04	6.13	−2%



MOTOR VEHICLE DEATHS

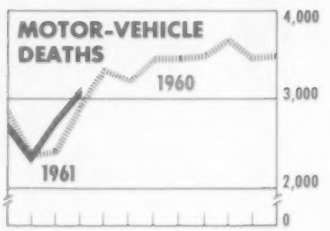
FOUR MONTHS 1961

CHANGES IN DEATHS

Number of Reporting States		Number of Reporting Cities Over 10,000 Pop.
27	UP from 1960	224
0	SAME as 1960	314
22	DOWN from 1960	210

GREATEST PER CENT REDUCTION IN DEATHS

States		Cities Over 200,000 Pop.	
Alaska	− 57%	Charlotte, N.C.	− 88%
Hawaii	− 39%	Washington, D.C.	− 69%
Delaware	− 39%	Richmond, Va.	− 69%



HOME AND PUBLIC DEATHS

FOUR MONTHS 1961

HOME DEATHS

UP from 1960:
Poisonings

DOWN from 1960:
Poison gas
Suffocation
Firearms
Falls
Fires, burns

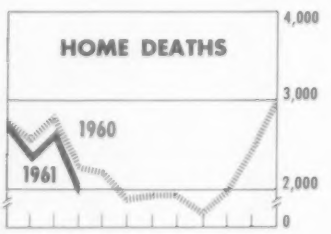
AGE GROUPS
Change from 1960

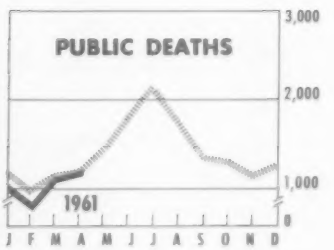
Home		Public
Down	0- 4	Up
Down	5-14	Down
Up	15-24	Down
Down	25-44	Down
Down	45-64	Down
Down	65-74	Down
Down	75 & Over	Down

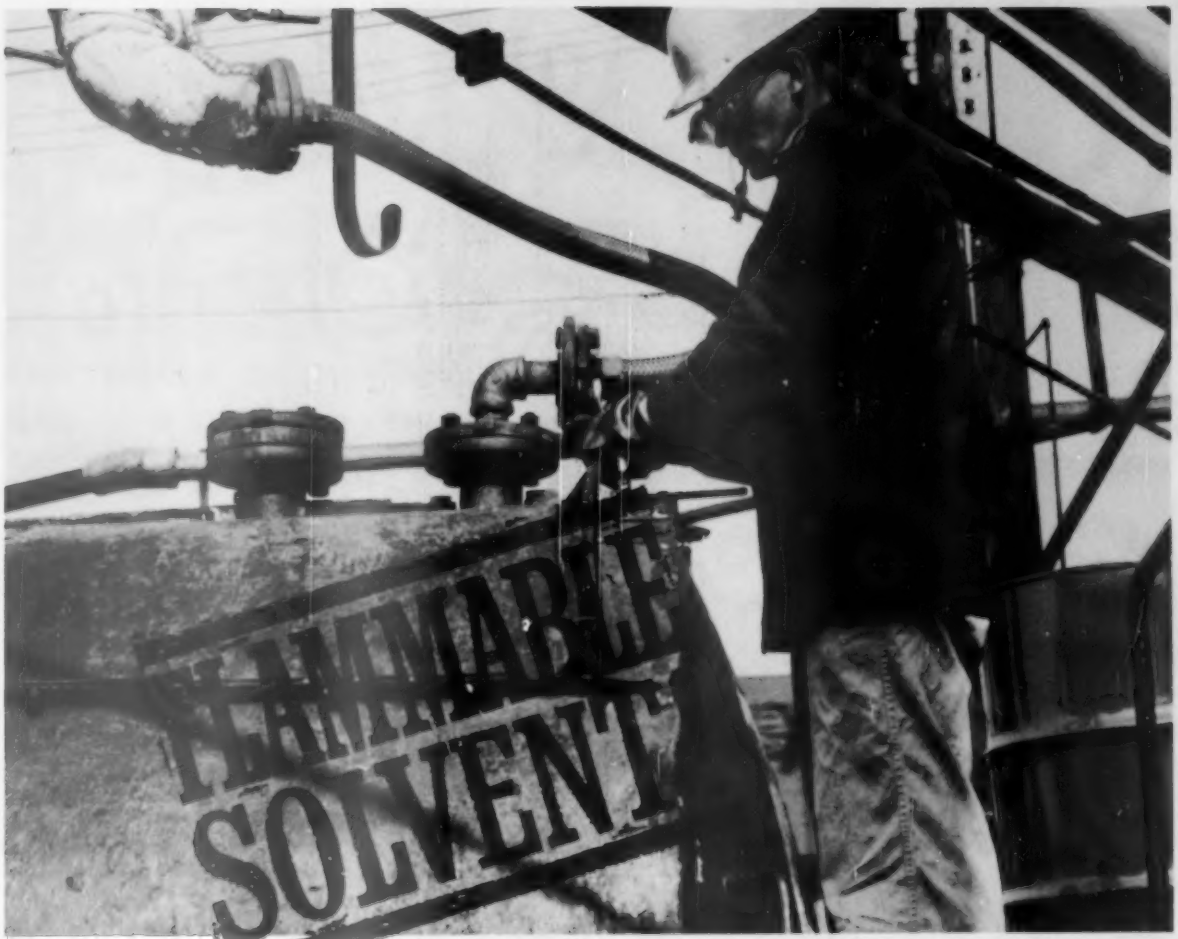
PUBLIC DEATHS

UP from 1960:
Firearms
Fires, burns
Drownings

DOWN from 1960:
Transportation
Falls







WHERE THERE'S A CHANCE OF FLAME

Clothing treated with Du Pont X-12* Flame Retardant gives employees protection with comfort

DuPont "X-12" gives you a modern, trouble-free way to protect work clothes against the spread of flame. It's Effective. Garments treated with "X-12" Flame Retardant will not support combustion. They're self-extinguishing once the source of the fire is removed. It's Renewable. Clothing is treated at your laundry each time it's washed. So your employees always get assured 100% protection. It's Comfortable. "X-12" Flame Retardant doesn't clog the pores of the garment, allows it to "breathe". So comfort isn't sacrificed. No need for heavier clothes that cut employee efficiency. A growing number of industrial and commercial laundries offer this low-cost treatment. For more details, send the coupon below

*trademark

DU PONT REG. U.S. PAT. OFF. **X-12 FLAME RETARDANT**

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
2545 NSX Nemours Bldg., Wilmington 98, Delaware
Please send booklet describing the advantages of work clothing treated with "X-12"

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

CIRCLE 7 ON READER CARD

Hundreds of early risers, such as these Congress participants, will hear Bill Gove this year on "Time – Its New Dimensions."

Congress "Early Bird" Speaker Named

EACH YEAR October visitors to Chicago's Conrad Hilton hotel witness an amazing sight. They see delegates to a convention literally pouring into the hotel's grand ballroom at a dawn-cracking 8 a.m. (Convention-goers are supposed to be night owls and late sleepers.)

Bill Gove

The hundreds of early birds who forego breakfast to overflow the Hilton ballroom each year are the nation's top safety men attending the early-morning sessions at the National Safety Congress.

And judging from the program planned for the 1961 Congress, there will be the usual standing-room-only signs out. This year's speaker will be Bill Gove, nationally known for his many talks before trade associations, chambers of commerce, sales meetings, and banquets. Mr. Gove will have as his over-all theme, "Time—Its New Dimensions."

"Most of us," says Gove, "spend a great deal of time and thought studying how to invest our money profitably, but very little time preparing ourselves to invest our *time*. Yet all around us are those who are accomplishing two, three, a dozen times as much as we do in the same allotted 24 hours a day." Gove will show how time has more than one dimension—more than clock and calendar significance. He will suggest ways a person can change his image of what time really is and look to its dimensions for spectacular improvement in the area of time management.

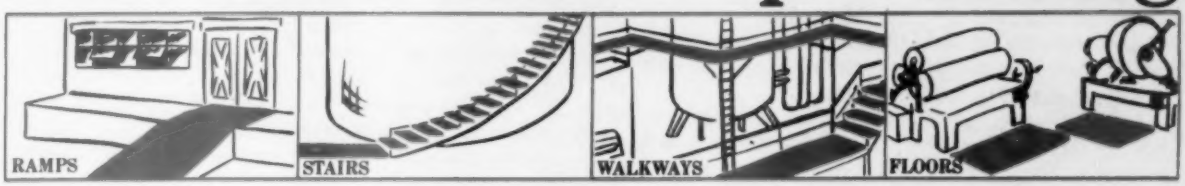
In his Wednesday morning session, Gove will show how to manage time by using its four dimensions—habit, energy, alertness, and communication— to do and be better. On Thursday, he will set forth the "swap" concept—getting things done through other people. "People don't like to be handled, manipulated, or techniqued," says Gove. "They want to motivate themselves. Our job is to find the specific incentives that will trigger their motivations."

for SAFETY UNDERFOOT

Magic

T.M. REG. U.S. PAT. OFF.

Non-Skid Anti-Slip Coating



Slip-proof any ramp, stair or floor near dangerous machinery with Magic for Safer Surfaces. The all-weather permanent safe finish. More Safety for Less Money.

EACH UNIT WILL SLIP-PROOF 90 SQUARE FEET AT A GREAT SAVING AND YOU NEED NOT DO IT AGAIN

20% of all Industrial Accidents are the result of slips and falls. Magic Coating greatly reduces these costly industrial falls. Anyone can apply it once and it aways lasts.

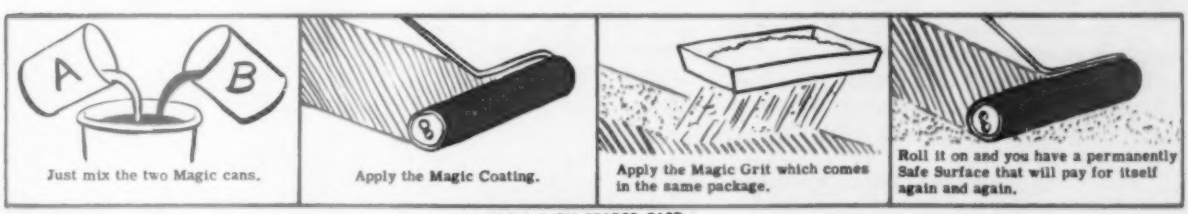
Magic strengthens any surface. When used over concrete it substantially adds strength life and protection and builds great resistance to impact.

This factory-tested and fully guaranteed coating gives a durable permanent and safe surface to wood, concrete or steel. We have developed this product to withstand tremendous impact and resist chemicals and abrasion. It will slip-proof floors, walkways, ramps both indoors and outdoors. Absolutely unaffected by weather, temperatures, rain or any other elements.

FACTORY TESTED

Magic Non-Skid, Anti-Slip Coating is conveniently packed in cartons weighing less than 40 lbs. F.O.B. Shipping point at $27.50 per carton. Order from your nearest Safety Distributor or from us.

Another Safety Product developed by The Silicone Paper Company of America, Inc., 230 Park Avenue, New York 17, New York.


A
B
Just mix the two Magic cans.
Apply the Magic Coating.
Apply the Magic Grit which comes in the same package.
Roll it on and you have a permanently Safe Surface that will pay for itself again and again.

CIRCLE 8 ON READER CARD

THE SAFETY VALVE

Nothing human is alien to me
—TERENCE

Power in Repetition

ON COUNTLESS barn roofs throughout the Southland there are signs urging the tourist to visit "Beautiful Rock City Atop Lookout Mountain." On our first trip to Chattanooga our sales resistance held out. We rode the fascinating inclined railway up the mountain but passed up Rock City.

But on a second trip, repetition of the sales message finally wore us down. It may have been one particular sign at some point between Evansville and Chattanooga that tipped the scale.

In our safety communication we are constantly exhorting foremen and others to keep on telling people what they already know. Too often we overlook the power of repetition.

Keeping Fit

MANPOWER, including brainpower as well as the manual skills, used to be a commodity a company could buy on the open market. Now business realizes people are not expendable and is making commendable efforts to keep them healthy and happy at all employment levels.

That goes for the highest as well as the lowest paid groups. For highly responsible jobs, the problem is to make the compensation (after taxes) and fringe benefits sufficiently attractive to compete with jobs offering less gross pay but fewer headaches and more time for fishing.

Big shots have occupational diseases, too. Ulcers, heart flutters, obesity, insomnia, and many other ailments cut down efficiency and shorten careers. When the danger signals become too persistent to be ignored, Mr. Big seeks medical advice. He is warned to slow down – or else – by an M.D. who often is burning the candle at both ends more rapidly than his patient.

A man who gets enough sleep can take a lot of punishment on the job. Sleepless nights account for many a bad disposition and many an unsound decision.

How much sleep to get and when to get it is an individual matter. Some people are at their best early in the day while others begin to function only around quitting time. Working hours generally represent a compromise between the preferences of owls and early birds.

Not being a psychologist or a medicine man, I don't know the answers. I've done my share of worrying. But over the years I learned one thing: losing a few hours sleep won't kill you. Sometimes, because of something I ate or a deadline for which I wasn't prepared, I've still been awake at 1:30 a.m.

Some people claim they keep a pad and pencil handy to jot down bright thoughts that come to them during wakeful hours at night. But I can't remember a usable idea that came to me at such times, nor have I ever solved any pressing problems. Sleep usually came before 2:30 if I didn't pursue it or try to do the next day's work.

Taking a nap after lunch has been highly recommended as an antidote for the pressures of modern life. My father, now nearing the century mark, has done it for years. But until last November I'd never been self-employed or worked in a place that had the facilities.

Top Towns

SOME TIME ago the circulation department of *Harper's* sent out a letter to a select list of people in 53 hand-picked communities. The letter, according to William Feather, said in part:

"Your community is relatively small, but it is one of the 53 most influential communities in the United States. It is an important community because its residents are important, on the basis of education, income and civic activity.

"So it is with *Harper's*. In spite of its relatively small circulation, *Harper's* has almost as many subscribers in these 53 communities as any magazine published in America."

Now I have been a *Harper's* subscriber for years; it's the only intellectual magazine we receive. My subscription expired about the time the above letter was mailed. Like all publications, *Harper's* fights hard to keep a subscriber but they used that bait only on residents of the 53 communities.

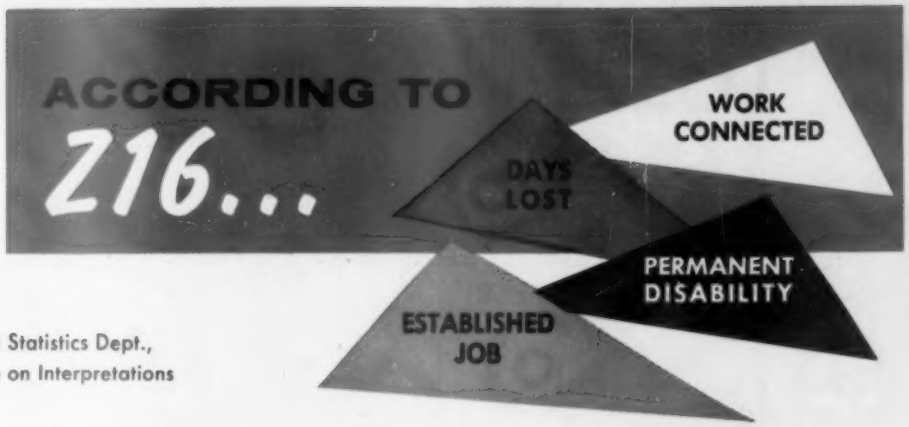
Most of the cities listed are suburbs and Chicago is exceptionally well represented. Evanston, of course, is included. Other Chicago satellites are: Glen Ellyn, Highland Park, Hinsdale, Lake Forest, River Forest, Wheaton, Wilmette and Winnetka.

Mr. Feather doesn't know who decided that these communities were so distinguished and included the piece in his magazine principally as a topic for conversation.

Maybe I'm prejudiced but I couldn't help wondering what some of these towns had that Park Ridge didn't have.

Obsolescence is a factor which says that the new thing I bring you is worth more than the unused value of the old thing. – *Charles F. Kettering.*

Carman Fink



By H. GENE MILLER

Manager, NSC Research and Statistics Dept., and member, Z16 Committee on Interpretations

The Doctor's Opinion in Back Cases

IN MOST INJURY accidents, an opinion from the doctor who is authorized to treat the case is not necessary to determine reportability. The standard provides that reportability shall be based on two objective criteria: (1) Did the injury arise out of and in the course of employment? (2) Did it require a full day's time lost from work, or result in some permanent impairment? Only if there is doubt regarding the degree of disability does the standard provide for introducing the doctor's opinion (Section 5.18).

In back cases, however, the standard suggests that a doctor's opinion be obtained in every case in order to determine the relationship between the disability and the man's work. Specifically, (b) of Section 5.2 states:

"The physician authorized to treat the case is satisfied that the injury could have arisen out of the accident or incident."

As with other parts of the standard, the section on back injuries of necessity had to be written in general terms. Any attempt to write it so as to cover every possible way in which a back injury might occur would have resulted in a document so voluminous and complex that it would have been difficult, if not impossible, to use at all.

Through the years, though, the body of decisions built up by the Committee on Interpretations actually has become as important in deciding cases as the printed words of the standard themselves.

In back cases, the Committee on Interpretations has found it desirable to take the position that a doctor's opinion should be obtained in every case, and a case should not be excluded from the records unless the authorized doctor stated there was no relationship between the disability and the man's work.

The committee has taken the further position that if a doctor is not seen, or if he does not deny a relationship between the injury and the accident or incident, the case should be counted. The burden of proof is placed on the employer and the doctor to disprove any connection between the disability and the accident or incident. The committee believes that unless this position is taken, a premium would be placed on avoiding medical attention. This would be contrary to the basic philosophy that the standard should never be written or interpreted in such a way as to discourage the injured from getting medical help.

Illustrating these points, the example cases include two in which the doctors did not deny a relationship between the injuries and the work (582 and 732); one in which the doctor did deny such a relationship (615); and one in which no doctor's opinion was given (597).

Case 582. An employee was unloading half-inch pipe from a truck and storing it on a rack under some larger pipe. He had 20 ft. of pipe (weighing approximately 20 lbs.) in one hand when he stooped over and turned to line up the pipe with the rack before pushing the pipe in place. As he turned, he felt a severe pain in his back and could not straighten up. When the pain did not let up, the employee report- to his foreman, and then to a doctor. The doctor diagnosed the condition as a sprained muscle of the back lumbar region. The employee lost five days from work.

Decision: The committee ruled that this back case should be considered a work injury and included in the company's injury rates. Although the pipe which the employee was handling was not heavy, it was long and awkward, and the committee believed that handling it placed more strain on the person than was indicated by the weight. Moreover the employee was working in a stooped position and was required to twist his body in order to put the pipe into position. The committee felt that these circumstances constituted an event likely to result in back sprain, and since the doctor did not deny a relation-

— *To page 116*

This series of articles is presented to provide a better understanding of the standard injury reporting procedure, to accomplish more uniformity in the classification of injuries, and to permit the safety man to rule on more of his own cases. The wording and intent of the Standard will be cited, illustrated by rulings of the Committee on Interpretations.

16,000 Space Men

The workers who are building our space program face every known industrial hazard, and even find a new one occasionally

EVERYONE knows about America's first astronaut, and most people know about the precautions taken to assure him a successful flight. Only a handful know of the hazardous work it takes to make one of those big birds fly.

George D. McCauley, safety officer of the National Aeronautics and Space Administration, says NASA's 16,000 employees face every conceivable hazard in the six research centers and two field stations of the space agency's far-flung operations.

Experimental work essential to push back the space frontier involves the use of high-voltage electricity, radioactive materials, tremendous air and gas pressures at temperatures of several thousand degrees Fahrenheit, developing and testing extremely toxic high-energy fuels, rocket propulsion, and operation of two reactors and a cyclotron.

While exotic fuels and excessive temperatures and pressures are more challenging, more interesting, NASA safety men can't ignore routine hazards. If a cord must be stretched across a machine shop floor, a small weighted DANGER flag is placed near it to remind the unwary to step carefully.

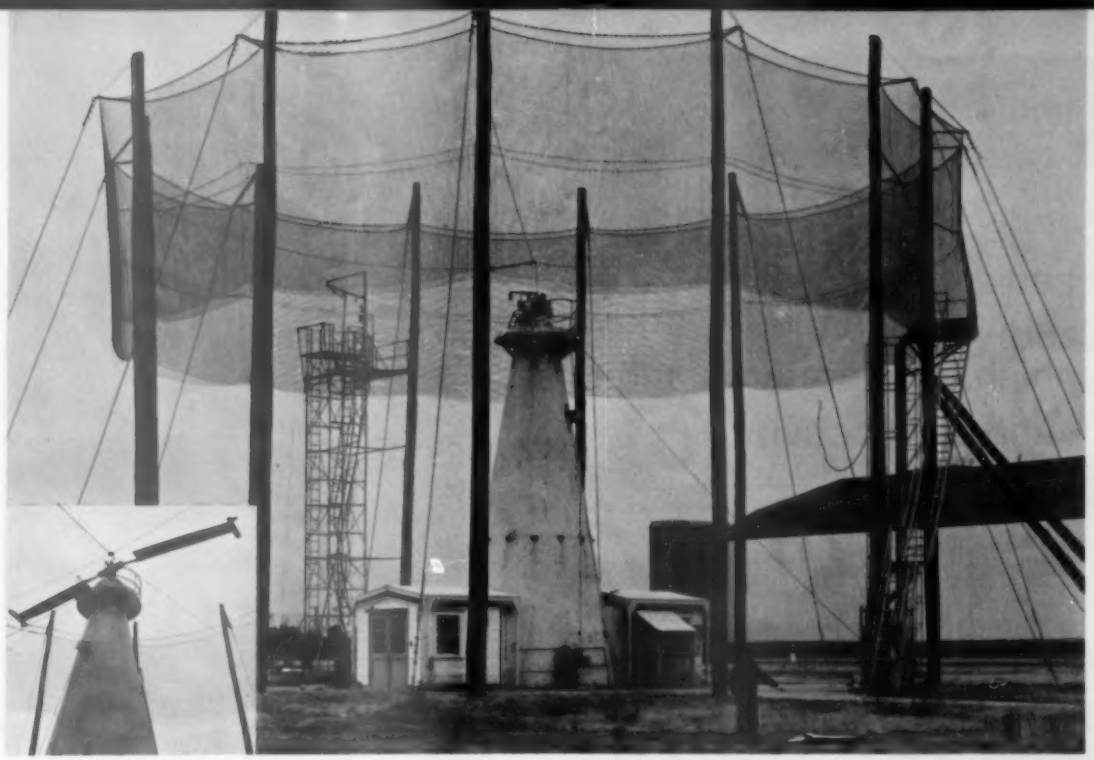
Oil cans are the flexible spout type, so no one putting his hand down on the spout, or even sitting on it, as one unfortunate did on a stiff-spout can, will be injured.

Wiring is three-wire. Air guns are designed to protect skin and eyes. Paper wipers, not rags, are available to shop workers.

Hazards, simple or complex, don't delay experiments. NASA safety men work *with* scientists and engineers, not against them. They anticipate hazards, and protect personnel who must set up new equipment or take readings on a new material's performance. They can't cover all risks, any more than all hazards in a flight can be covered, but reasonable risks are engineered out.

Astronaut Alan B. Shepard at the Mercury controls.

Bird getting ready to fly.



Helicopter blade test stand has double woven wire fence loosely hung to protect research center personnel and players on nearby golf course. As one visitor remarked, "Good idea —a helicopter blade coming through the fairway . . . enough to make a fellow top his drive." Man shows remains of broken blade.

New hazards arise constantly in experimental work. This one-fifth-scale test stand for the one-fifth-scale Saturn model has one spot where it is not to scale. Man on ladder shows how ladder was moved for foot clearance.

Did Safety Put Us Behind in the Space Race?

Maxime A. Faget, Chief,
Flight Systems Division, Space Task Group,
National Aeronautics and Space Administration

MAX FAGET, the man who designed the Mercury capsule that took Alan Shepard on his sub-orbital ride into space, says ground safety and flight safety are opposed. Lest this draw the fire of the entire organized and unorganized safety field, he hastens to amplify: the flight man wants a vehicle to operate easily; the safety man wants fail-safe procedures.

Actually, there are no two such opposing camps; it just seems that way sometimes when goals clash.

In our society we cannot place a value on human life. Before a Project Mercury shot we go to great trouble and expense – even take serious risks – to make sure no ship has strayed into the impact area. The risk to the searchers is probably greater than it is to the crew of any ship in the vast impact area. This is an emotional matter, not a logical process.

The men who run Project Mercury could have put a man in orbit a long time ago if they had been willing to take a long gamble on getting the man back. Merely putting a man into orbit is not the long-range purpose, though. The purpose is to learn how to build space vehicles.

16,000 Space Men

Personal Protection

space men must work with exotic fuels, high temperatures and pressures, and radioactivity

Project Echo (the 100-ft. satellite) employees had to wear respirators and protective clothing for protection against sublimation materials.

Men working around 90 per cent hydrogen peroxide take no chances on getting it on the skin. A shower on truck is a further precaution.

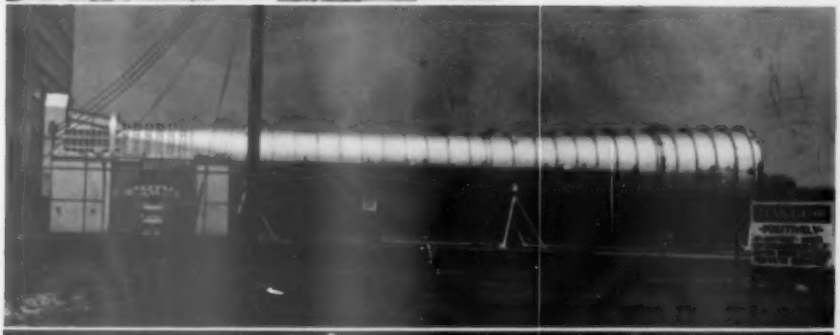
Employees dressed for the job of filling two 500-gal. hydrogen peroxide tanks. Deluge showers on truck and at filling valve protect men. Hydrogen peroxide must be stored in tanks of pure aluminum.

Personal protective equipment used in handling cyanogen — antidote, masks, self-contained breathing apparatus, goggles for looking at flame. Medical staff stands by full time while cyanogen is in use.

Hearing Protection

the space business can be a noisy business

Operators of NASA 9- by 6-ft. Thermal Structures Tunnel must wear ear protection during tests.



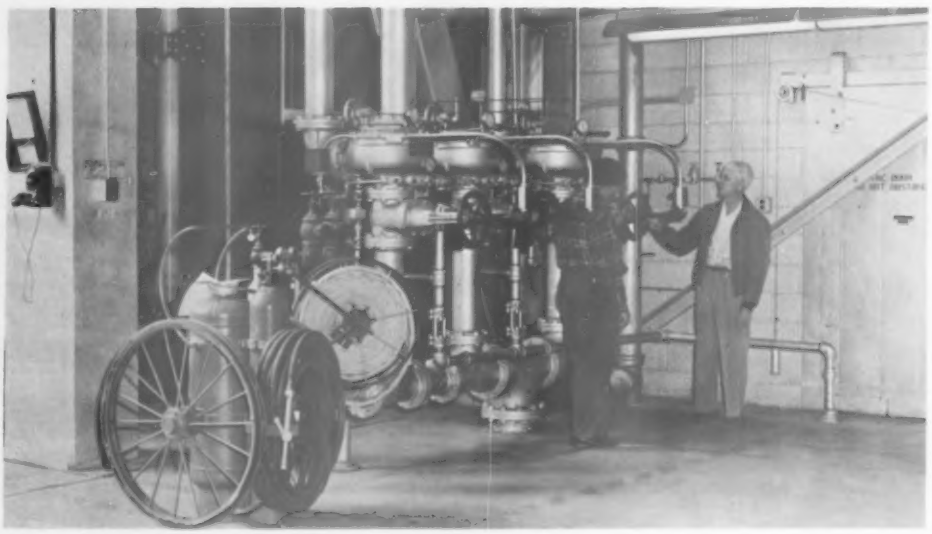
This diffuser was added to the "blow-down tunnel" to reduce the unendurable noise. Readings are still as high as 156 db 75 ft. from the diffuser throat. NASA technicians calculate 200 db at the throat. The blast is so strong it broke up a concrete slab laid in front of the throat.

Model of 9- by 6-ft. Thermal Structures Tunnel. Air bottles at top are 145,000 cu. ft. capacity, and filled to 600 psi. Specifications for these tanks were: greatest diameter and length possible for shipment on a gondola car. Tanks are manifolded, then air is released through tunnel to test components. To simulate Mach 3 at 35,000 feet, heat is added to the air stream to heat it to 660 F. Sometimes men must enter the hot area to free jammed equipment. The man wears entry clothing, and another man — the only man who handles the single set of keys — stands by.

16,000 Space Men

Fire Protection

touchy fuels and processes using great heat call for the finest in fire protection equipment and training



Fire Marshal Marvin Forrest (right) explains operation of built-in fire apparatus to new employee. On post at left are fire evacuation plan, direct phone to fire department, and break-glass fire alarm. Left foreground, 150-lb. "Purple K" wheeled unit. At right of wheeled unit, high pressure 1½-in. hose with fog nozzle. Above hose, 2½-in. outlets for hookup to high pressure system. In front of Mr. Forrest, one of three sprinkler alarm test buttons. At right, fire door to shop area.

This "Christmas Tree" training device was developed to train NASA employees on the use of dry chemical extinguishers on gas fires. Several facilities use methane under high pressure and high rate of flow.

Tests are run to determine the effectiveness of extinguishing agents on the various special risks at NASA. Here a dry powder agent is suspended above rocket propellant to determine its effectiveness.

Fire extinguishers are marked with an orange and red three-dimensional marker. The 3-D treatment makes it easy to locate the unit.

Fire Prevention Inspector Duane McSmith examines complete emergency and fire evacuation plans. From left: break-glass station, spare sprinkler parts, high pressure standpipe hose, water extinguisher. A fire warning bell and a 3-D marker also are located at this station.

This man attacking a flammable liquid fire with CO_2 will discover he has more fire than he can put out alone. Purpose is to drive home the lesson that it sometimes takes more than one to down a fire.

Step two in the teamwork lesson is to teach simultaneous use of extinguishers. Women employees are trained to use extinguishers in areas where men are not normally present. Women prefer the 10-lb units.

"The essential part of our program is the monthly factory manager's meeting."

"I've stuck with safety because I believe in it so much. There's something different about safety."

"We have 4,400 men and women and all kinds of hazards exist.

How to Set A World Record

This safety supervisor believes in getting management and workers so interested in accident prevention they'll act on their own initiative—and it works

ELLEN SHEAHAN reported for work as usual on April 10, 1959. Her job was taking shank pins out of the eyelets of basketball shoes as they came out from under a clinching press. At 10 a.m. that morning the tray of pins at her side was accidentally upset. When she got down on her hands and knees to collect them, her arm was caught in the conveyor mechanism. She suffered a serious fracture and flesh wound of the upper arm.

The incident ended the longest period of safe man-hours ever run up in the rubber industry—13,970,161.

That all-time record, plus a string of other long no-accident periods, was the result of a decade of accident prevention promotion at U.S. Rubber's Naugatuck Footwear Plant in Connecticut.

Behind the program that made this achievement possible is E. C. Shedd, Naugatuck's supervisor of safety.

Shedd came to the Naugatuck plant in 1942. "I had no experience in safety," he says. "But before accepting the job, I went to the technical library in Hartford and read through some books I found there. One of them was an Aetna Insurance Co. publication, and led me to an interview with one of that firm's top men. He gave safety a big buildup, and that night I decided I wanted the Naugatuck job. I've stuck with safety ever since then—because I believe in it so much. There's something different about safety work."

Former Connecticut Gov. Abraham Ribicoff presents a plant worker with a State General Assembly joint resolution commending Naugatuck's safety record as best among Connecticut industries.

Shedd's interest in safety has grown with his program. He is now a frequent speaker at Connecticut church groups and Grange meetings, showing films and emphasizing on- and off-the-job safety.

Basically a quiet, soft-spoken man, he develops a glowing enthusiasm when he tells the Naugatuck safety story. Showing through his natural reserve is the pride he feels in the men and organization that have made the program a success.

The story really starts back in 1951, he says, "when we had 60 disabling injuries including lost fingers and hands, and one lost eye."

That was not a record to be proud of.

But Shedd was armed with the idea that enthusiasm and education are better than enforcement, and was winning growing cooperation from teammates in management, production, engineering, and purchasing. Spurred by the year of serious, costly accidents, he began his campaign against apathy, ignorance, and hazards.

In 1952 there were 25 disabling accidents at the plant.

In 1953, at least 23 injured men were sent home.

In 1954 there were only 7 major injuries.

In 1955 the plant set a world's record for the rubber industry of 10¼ million safe man-hours. The disabling injury which stopped this record was followed by another 7 million safe man-hours. After 3 disabling injuries in the spring of 1956, no more occurred for nearly 7½ million man-hours when, again, 3 disabling injuries occurred in 1957.

Plant watchmen double as safety inspectors. Here one notes uncovered solvent can and hot plate left on. Watchmen's memos are coordinated and sent to supervisors for quick corrective action.

From September 1957 until April 1959 safe man-hours reached nearly 14 million, the present world's record. Then another disabling injury was followed by 11½ million safe man-hours.

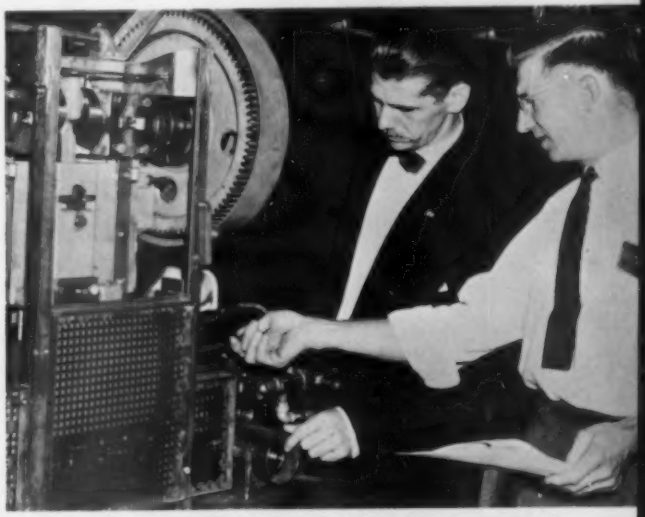
This record ended when a worker was struck in the eye by a narrow band of rubber snapping off a mill roll. Although suffering only from hemorrhage about the eye, the worker was kept away from work to forestall complications. He made a complete recovery.

That was in July 1960. Since then scattered accidents have prevented the plant from attaining massive safe man-hour periods, but the frequency rate remains only about a fourth of that for the entire rubber footwear industry. (For the year ending Dec. 31, 1960, the plant had a .23 frequency rate and .27 severity rate, compared to a .94 frequency rate and .64 severity rate for the rubber footwear industry during the same period.)

Figures on the plant's workmen's

— *To page 68*

Shedd calls this monthly factory manager's meeting the core of the Naugatuck safety program more useful than a safety committee.



Unable to correct existing hazards overnight, Shedd and project engineer John Borisuck make new machines like this one super-safe.

Who's Responsible For SAFE GRINDING?

The user?
The machine builder?
Or the wheel manufacturer?

By FRED C. STOCKINGER

Chairman, Safety Committee,
Grinding Wheel Institute,
Cleveland, Ohio

Employee finish-grinding weld beads with a portable pneumatic grinder. He wears rugged cup goggles. This portable grinder is equipped with a substantial and efficient metal guard.

RESPONSIBILITY for safe grinding is divided among: the grinding wheel manufacturer; grinding machine builders; and the user – including management (through the plant safety engineer), supervision (superintendents, foremen), maintenance men (responsible for machine repair), receiving department, stockroom, truckers, and most important, machine operators.

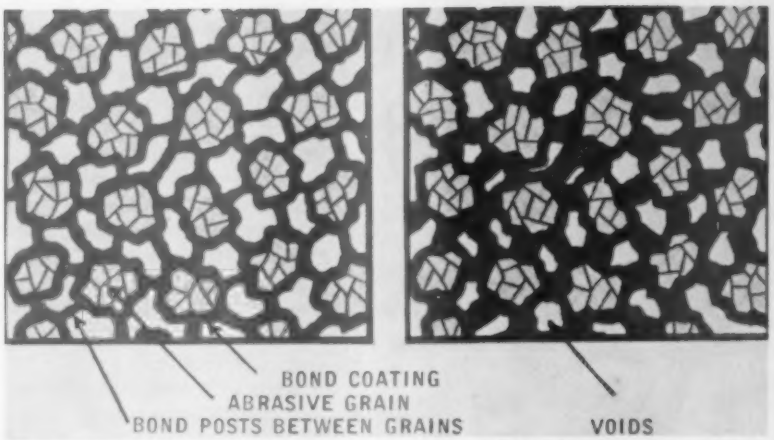
Continual diligence on the part of all three groups could eliminate accidents entirely on grinding operations. By enabling persons in each of the three groups to understand their responsibilities more clearly – if this article prevents only one man from being injured – our purpose will have been achieved.

In defining the problem, recognize that no grinding wheel is unbreakable. In fact, many are and must be fragile. The strength of a grinding wheel is limited by the operation.

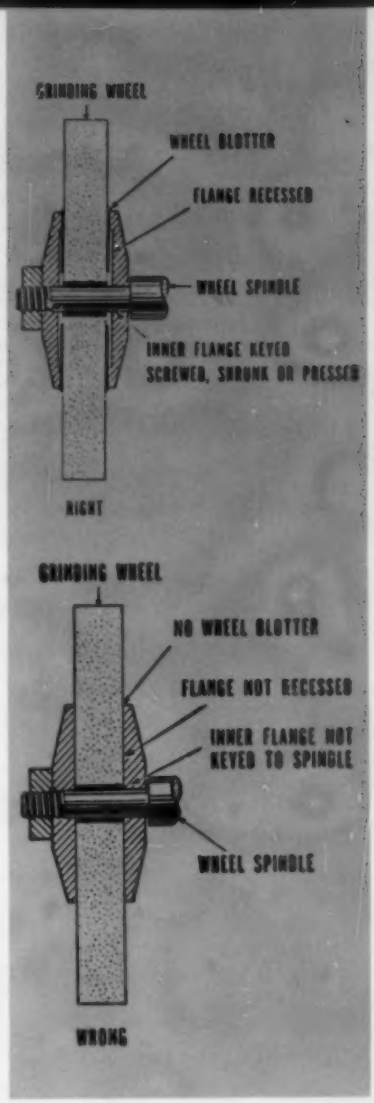
As the abrasive grains doing the cutting become dulled, pressure, impact, heat, and friction between these dull grains and the work piece must be allowed to break the dulled grains from the wheel, exposing new sharp cutting edges. In most abrasive wheels, voids or air spaces must be built in to provide room for metal chips to curl while being cut and before being thrown from the wheel by centrifugal force.

If a wheel is made stronger

Snag-grinding metal on a floor grinder. Sharp edges and heat generated by grinding call for gloves. Worker is steadying work piece against his body. Safety shoes guard toes.



The size of the bond "posts" which support each grain of abrasive determines the hardness of the wheel. At the left is a magnified cross section of a soft (weaker) wheel. Wheel on the right is a hard (stronger) wheel. Soft wheels shed grains easily. Right top: grinding wheel has wheel blotters; recessed flanges; and inner flange is keyed, screwed, shrunk, or pressed to wheel spindle. Right bottom, this particular grinding wheel has improper flanges and no wheel blotter.



(harder) than required for a particular grinding operation, the grains will not be pulled out by friction, heat, impact, and pressure after the grains become dull. The grinding wheel will no longer grind but will merely rub and create excessive heat.

To have a grinding wheel fulfill its purpose efficiently, grinding wheels cannot be made unbreakable, but safe operating speeds for the different classes of abrasive, bond, and reinforcement combinations can be determined and published (refer to Section 8 of ASA Code).

Machines can be designed and equipped so accidental breakage will injure no one, and operating rules can be established which — if enforced and obeyed — will keep stresses on a wheel in a safe range.

Responsibilities of Wheel Maker

1. Determine the strength of new products. Each grinding wheel manufacturer constantly strives to discover more efficient abrasives, bonds, and mechanical characteristics such as the shape of the wheel and reinforcing materials.

Whenever a new or different type of wheel is discovered, it is the manufacturer's responsibility to determine that this new product is safe for its intended and recommended use before the product is tested in customers' shops before being turned over to the factory.

Of great importance is the determination of testing speeds well above the recommended maximum.

2. Provide control procedures. After the new product has been turned over to the factory, the manufacturer has the continuing responsibility of seeing that each item conforms to the standard in size, shape, composition, and manufacturing techniques.

The wheels are actually run at a

Left: Speed testing of grinding wheels is done on totally enclosed variable speed machines at a predetermined testing speed before the maximum safe operating speed is printed on the wheel, tag, blotter, or box. In this way each wheel conforms to standard in shape, size, composition, and manufacturing techniques.

Above: Machine builder has provided wheel guards thick enough and of the correct material, shape, and proportion in relation to wheel to protect the operator and all others in the vicinity in the event of breakage.

Left: The user must transport the wheels safely in his own plant and must store and stock them properly in his stockroom. Grinding wheels in these racks are stored for the best care of the wheels and in the best housekeeping interests of the user.

predetermined testing speed before the maximum safe operating speed is printed on the wheel, tag, blotter, or box. Speed testing is done on totally enclosed variable speed machines.

3. Mark products clearly with maximum safe operating speed. Determining the maximum safe speed at which a wheel can be safely operated would be of no use if the user were not informed of this speed. Due to the impracticability of marking some types of wheels, this maximum safe operating speed may be shown in a notation such as "Speed not to exceed 1240 rpm" on the wheel blotter, on a tag accompanying the wheel, or with small wheels on the small box in which they have been packed.

In this case, if the small box is kept in the user's tool room with the wheels passed out to operators without the box, it becomes the responsibility of the tool room attendant or possibly other persons of authority in the user's plant to see that the maximum safe operating speed shown on the box is not exceeded.

4. Package wheels to protect against impacts reasonably expected in transit to the customer. Being more familiar with the degree of ruggedness or fragility of his abrasive products, the manufacturer carries the responsibility of packing his grinding wheels properly.

These packing requirements vary. But when the wheel leaves the manufacturer's plant, he no longer has control over wheels being sent directly to users and no longer is responsible for injury to wheels caused after the wheels have passed from his control. The degree of care required in packing is only against reasonably foreseeable shipping impact, for the manufacturer can't be expected to protect against damage by train wrecks and truck accidents or careless handling by the carrier or receiver.

5. Serve as a source of information to which users may direct questions concerning proper use of the product. Although the manufacturer can't be present on the thousands of varied jobs where his wheels will be used, all manufacturers have technical men to advise when asked on the proper application of his product to all operations.

Responsibilities of Machine Builder

1. Design machines according to safe grinding practices. Knowing the use to which his machine will be put, the machine builder carries the responsibility of designing and building the machine rugged enough to perform all operations his machine is designed to perform.

Motors must provide sufficient power. Bearings must be not too tight and yet not loose. And the entire machine must be heavy enough to be free from undesirable vibration.

2. Provide the machine with proper flanges, fixtures, and wheel mounts. Grinding wheel flanges usually should be not less than one-third the wheel diameter. The inner flange should be keyed or pressed on the spindle.

Design work-holding and driving fixtures that present no possibility for an accident, and wheel mounts that provide a spindle diameter large enough to prevent excessive deflection or vibration.

3. Guard the wheels with protective devices to prevent injury to the operator in case of accidental wheel breakage. An important responsibility of the machine builder is to provide wheel guards thick enough and of the correct material, shape, and proportion in relation to

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Are Your Storage Racks Fail-Safe?

Probably, if they've been designed by competent structural engineers for specific purposes and without harmful cost-cutting. But then there's the old bugaboo—human failure—to consider

MANY PROBLEMS plague materials handling operations, and among the most difficult are accidents that result from storage and warehouse racking.

National Safety Council figures show the frequency rate for this type of activity averaged 2.77 disabling injuries for each million man-hours worked in 1960 – about half of the frequency for all disabling industrial injuries.

But the average time of disablement for these injuries was 62 days, indicating the impact of severity of these mishaps on profit and loss ledgers.

While storing raw materials, work in process, and finished goods, rack accidents take an expensive toll in men and materials. This applies whether the racks are permanent installations or assembled portable pallet stacking frames. But why do they fail?

They may have been built by users with little idea of structural design and economic use. They may have been made by metal fabricators without help from structural engineers. They may have been designed properly for one specific use, but the user overloaded them by putting them to another use. And they could

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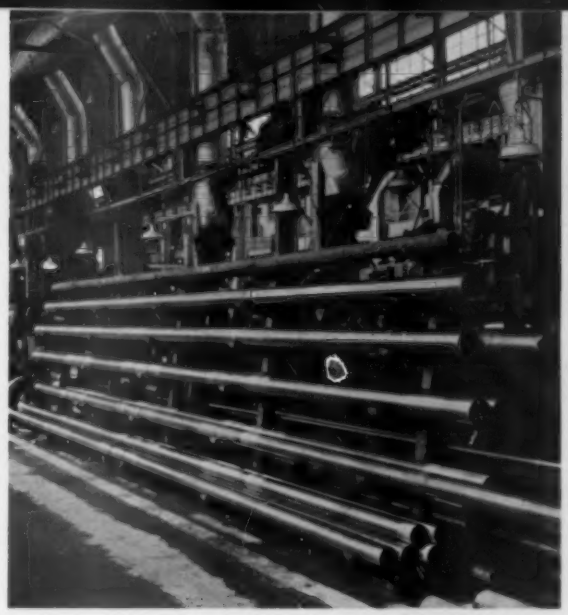


Heavy racks such as this provide the kind of structurally sound A-frame that can hold the weight of bar stock without endangering workers.

Fork lift truck operator positions uncrated equipment on adjustable pallet racks that can be altered to meet manufacturer storage needs.

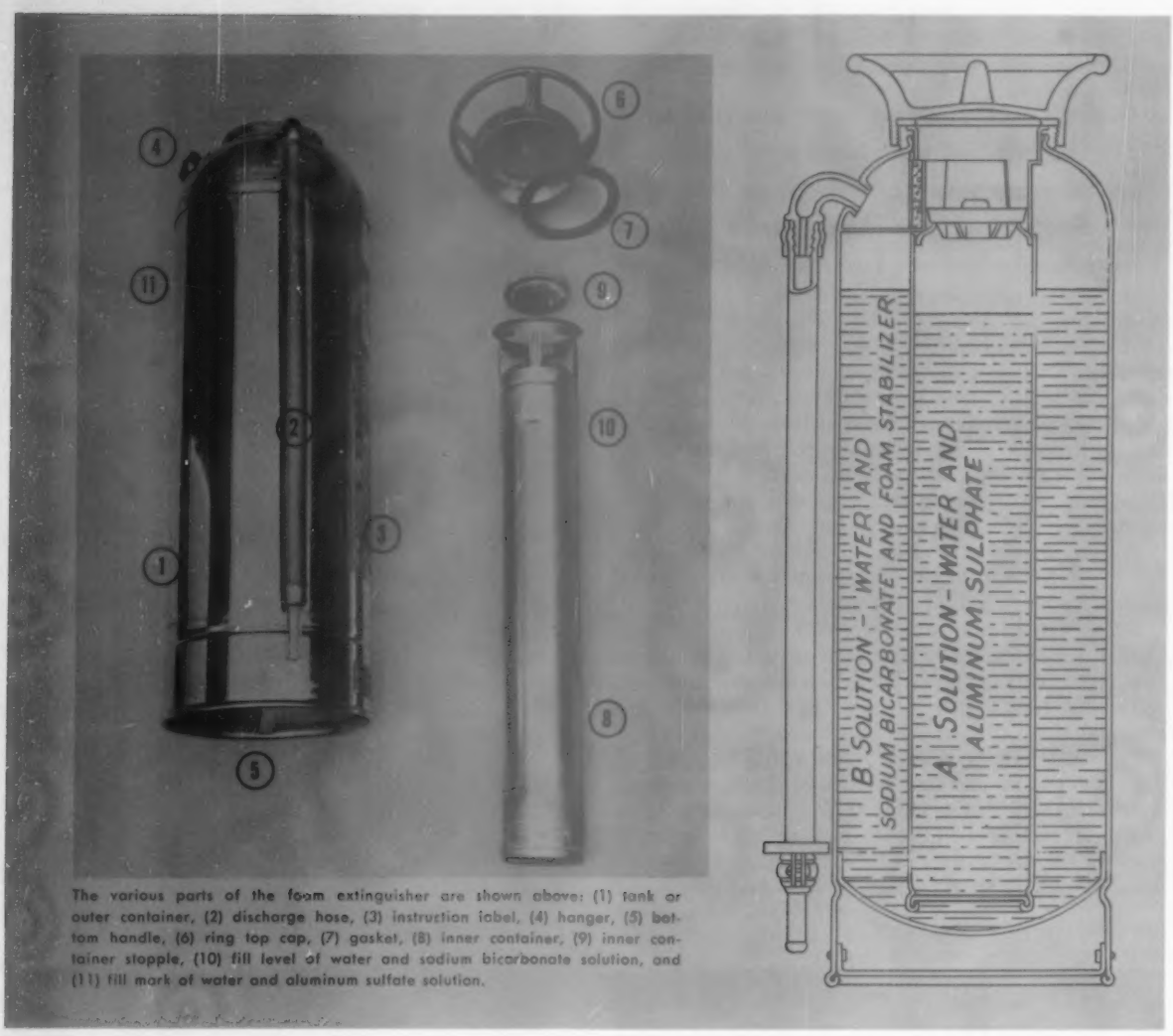
Drums of enamel and lacquer sit soundly on these racks, which have dogs to snug the heavy drums safely tight against the rack frame.

How to Analyze Your Storage Problems

1. Know input and output volumes for departments.
2. Know inventory level to guarantee volumes.
3. Know sizes, weights, and shapes to be handled.
4. Know possible future changes in these weights, sizes, and shapes.
5. Know which items can, will, or should be stored in unit loads.
6. Know inventory control accuracy needed.
7. Know which items move faster than others.
8. Know amount of storage volume available with limitations of floor loading, bay columns, ceiling heights, and aisle obstructions.
9. Know types and capacities of present handling equipment.
10. Know degree of special protection needed in humidity control, dust control, and refrigeration.
11. Know trainability of available labor.
12. Know cost per man-hour of available labor.

The Foam Extinguisher

what's inside—how it works



The various parts of the foam extinguisher are shown above: (1) tank or outer container, (2) discharge hose, (3) instruction label, (4) hanger, (5) bottom handle, (6) ring top cap, (7) gasket, (8) inner container, (9) inner container stopple, (10) fill level of water and sodium bicarbonate solution, and (11) fill mark of water and aluminum sulfate solution.

FOAM EXTINGUISHERS are available in a number of sizes. Most common is the 2½ gal. unit, weighing about 35 lbs. fully charged.

This extinguisher incorporates the principle of blanketing or smothering the fire by excluding oxygen, as well as the quenching and cooling effect common to water. It is therefore suitable for both Class A and Class B fires, except for solvents which are immiscible with water.

The discharge time is approximately one minute with an effective range of from 30 to 40 ft. An inner container, filled to the proper level with a water solution of aluminum sulphate and covered with a lead stopple, is held firmly in place by a rubber gasket and ring-top cap. A water solution of sodium bicarbonate fills the outer or large container. When the extinguisher is inverted for operation, the lead stopple will drop, permitting the two solutions to mix and produce approximately 20 gal. of chemical foam. Carbon dioxide gas is released in this chemical reaction, producing sufficient pressure in the extinguisher to expel the foam.

It is important to use only the chemical charges recommended by the manufacturer.

After the extinguisher is discharged, the inner container and stopple should be thoroughly cleaned and the interior of the extinguisher should be carefully washed out. Check the outlet screen to be sure it is not plugged and flush out the hose and nozzle with water.

One important feature in maintaining foam extinguishers is to insure that the pressure relief hole in the cap is not plugged and that the cap is screwed on hand tight.

how to use the foam fire extinguisher

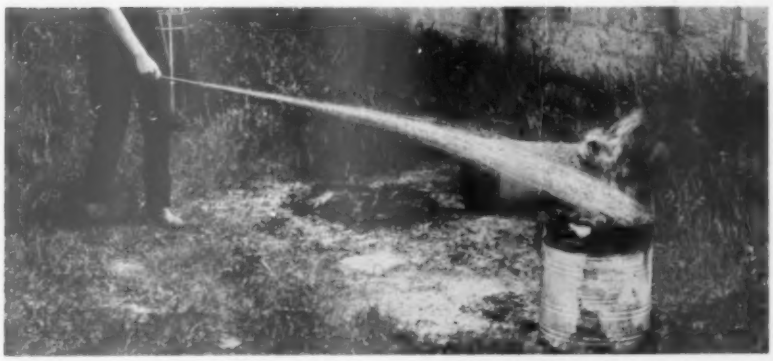
1. When the foam extinguisher is to be put into use, it is important to first grip the hose between the thumb and index finger of the right hand as shown in the photo above.

2. Next, holding the hose firmly with the thumb, grasp the handle of the ring top cap with the fingers of the right hand and the bottom with the left hand and lift off hanger.

3. After removing extinguisher from hanger, lower to carrying position. Carry extinguisher by ring top cap in an upright position to the fire, keeping firm grip on discharge hose.

4. To discharge, invert extinguisher by grasping the bottom handle with the left hand. At this point fingers of right hand should release top cap but continue to hold hose.

5. When the extinguisher is used to put out spill fires, the operator should stand back and curve the foam stream upward so that the foam will fall *lightly* on the burning area thereby preventing the fire from spreading. On Class A fires, the stream should be used directly against the burning area working the stream from side to side.



6. For fires in open containers, foam stream should be directed against back inside wall just above the burning surface so as not to splash the fire, walking around the fire if possible. Stream should not be discharged at close range as it may cause fire to spread.

This is the third in a series of fire extinguisher fact sheets prepared by Marshall E. Petersen, National Safety Council fire protection specialist.

Cautions on Use of Foam

1. Can be used on Class A Fires.
2. Can be used on Class B Fires.
3. CAN NOT be used on Class C Fires.
4. MUST BE discharged and recharged at least once every 12 months.
5. MUST BE protected from freezing temperatures below 40 F.
6. Should NOT be subjected to temperatures above 120 F.
7. MUST BE hydrostatically tested every five years.

IDEAS THAT WORKED

Devices and Ideas to Help Your Safety Program

By **ARTHUR S. KELLY,** Industrial Department, NSC

Reverse Message Doubles Usefulness of NSC Posters

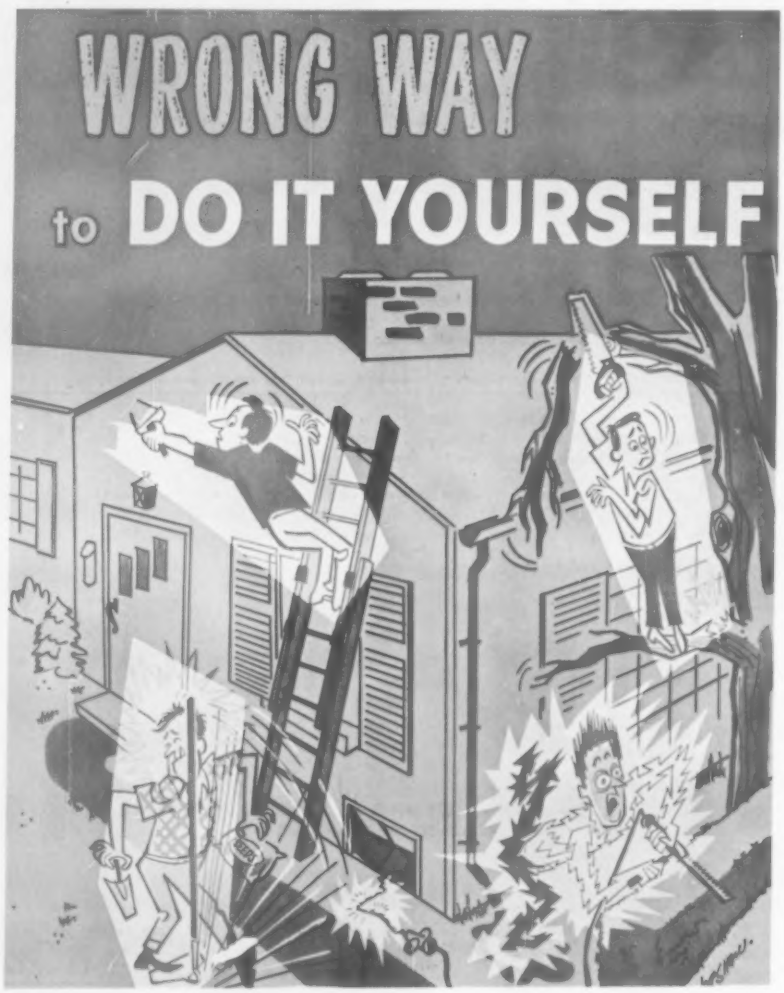
THE UNITED FUEL GAS CO. Charleston, W. Va., like many NSC members, uses Council safety posters on its bulletin boards. But the firm's safety director, R. E. McEldowney, adds a little something extra to them.

The one shown at right, for instance, has this message printed on the reverse side:

"Last year 11 of our employees had disabling injuries while at work. But this number is small when we consider that 108 employees had disabling injuries at home and away from work. Many of us are looking forward to our vacations. Let's not ruin them by having accidents, either on or off the job. People working on ladders should be sure that they are in good shape—don't reach out too far. Keep tools and equipment in their proper places. Watch out for shock while using electric hedge clippers and other electric power tools."

Foremen receiving these posters are instructed to read the message, add to it from their own experience, and discuss the subject at the weekly meeting with workers.

A standard note at the bottom reminds the foreman to take down all old posters before putting up the new one.



JULY WINNER

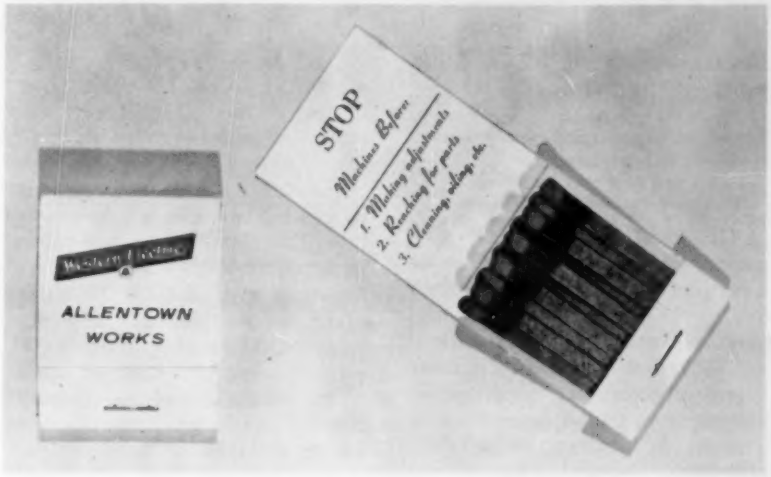
Judges of the July Ideas That Worked department picked E. W. Spencer's "Pleasing Prop for Posters," the plaster replica of the Venus de Milo. This safety and training supervisor of American Can Co., Brooklyn, N.Y., used the copy of famous classic sculpture as a bulletin board for his safety messages. He has also tied in the idea with a display of award banners for the plant's housekeeping and inspection competitions.

If People Read Matchbook Covers . . .

IN THE JUNE 1961 Ideas That Worked department we reported the use of safety messages on business cards, saying that if the cards were as closely read as matchbook covers, the idea was a good one. No sooner said than along comes this idea from Win Coleman of the Safety Department, Western Electric Co., Allentown, Pa.

These covers are printed by the company and made available to all employees. Messages cover subjects ranging from the safe use of hand tools to glass and chemical handling, safe lifting procedures, and first aid.

Notice, the matchbooks have to be turned to strike – extra safety.



How to Stretch a Safety Idea

SAFETY DIRECTORS are always in search of good poster ideas. Archie Henderson, safety director of the General Motors Diesel plant, London, Ont., Canada, turned the problem over to the competitive children of plant employees.

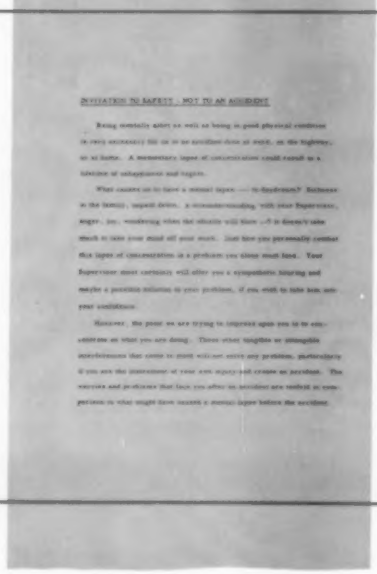
He printed entry blanks with space for each child's name, address, and parent's name. A sample poster, set of printed rules, and heavy 11-by-14-in. poster stock completed every contest entry kit. Poster stock was printed only with the words "My Dad Says. .," setting a theme for competition.

Kits were handed to all employees. The returns were so numerous and so good that 25 of the winning posters were reproduced in a 54-page booklet. Its cover and several pages are shown here. Henderson wrote an introduction to this booklet, and opposite each poster elaborated the idea or ideas presented.

The booklet is titled *Only 5 Minutes* and has been designed for use as source material for five-minute safety talks by foremen and supervisors.

The introduction suggests ways of organizing safety talks (review previous injuries, review previous unsafe practices, review coming work schedule), recommending the talks be keyed to the poster currently shown on company bulletin boards.

Some subjects covered by winning posters: safety glasses, the worker as the key to safety, safety shoes, safe clothes, safety's missing link, ladder and climbing safety, safe use of compressed air, and fork lift prudence. Incidentally, many of the best posters were of a general nature.



Death Rate at All-Time Low

Accidental death rate in 1960 51.7 per 100,000 population . . . deaths up 1 per cent but population up 2 per cent

By J. L. RECHT

Senior Statistician, Statistical Division, National Safety Council

THE 1960 accident death total was approximately 93,000, or about 1 per cent more than the 1959 death toll of 92,080. Disabling injuries numbered about 9,400,000 including 360,000 which resulted in some degree of permanent impairment—ranging from partial loss of use of a finger to blindness or complete crippling.

Death rate in 1960 per 100,000 of population was 51.7 – the lowest rate on record. The next lowest rates are 52.2 for 1959 and 52.3 for 1958.

Disabling injury totals for the principal classes of accidents were: motor-vehicle, 1,400,000; public non-motor-vehicle, 2,050,000; home, 4,100,000; work, 1,950,000. Duplications of motor-vehicle with other classes numbered about 100,000. Death totals are given in the table.

Accident costs amounted to about $13,600,000,000. This includes wage loss of $4,100,000,000, medical expense of $1,000,000,000, overhead insurance costs of $3,000,000,000, plus property damage in motor-vehicle accidents of $2,200,000,000, property loss in fires of about $1,108,000,000, and the "indirect" costs of work accidents of about $2,200,000,000.

The trend from 1959 to 1960 was up. Deaths from motor-vehicle accidents increased 1 per cent and home deaths rose 2 per cent. Work and public non-motor-vehicle deaths remained unchanged.

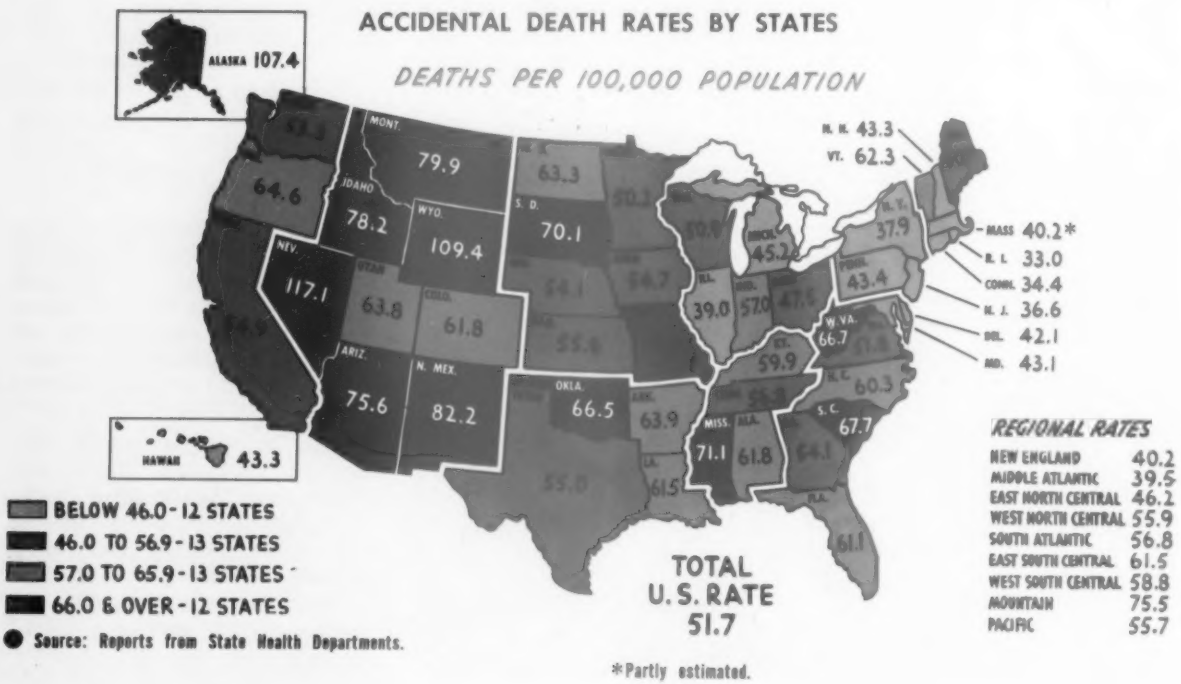
Present indications are that in 1960, as in earlier years, accidents were the fourth most important cause of death, exceeded only by heart disease, cancer, and central nervous system vascular lesions.

Accidents were the leading cause of death among persons 1 to 36 years old (according to the latest detailed information, 1959). Among males alone accidents ranked first from age 1 to 37.

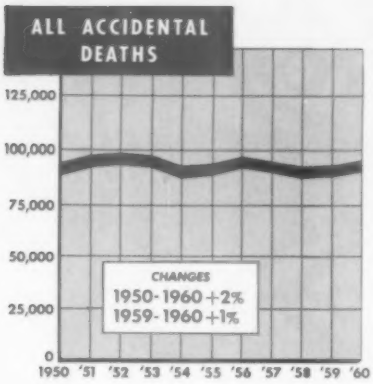
Accident types that were most important in 1960 were motor-vehicle accidents and falls with 41 per cent and 20 per cent, respectively, of the death total. Fire, burns and injuries associated with conflagrations caused 8 per cent of the deaths, and drownings another 7 per cent.

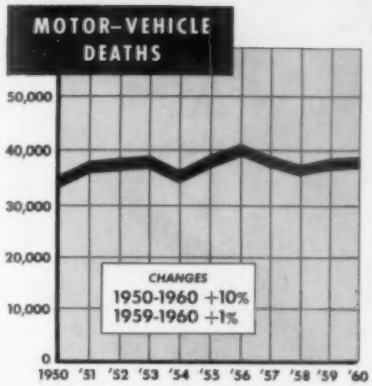
From 1908 to 1912, the five years preceding the formation of the National Safety Council, the average accidental death rate was 83 per 100,000 population. This was divided roughly into rates of 2 for motor-vehicle accidents and 81 for non-motor-vehicle accidents. By 1960 the non-motor-vehicle accident rate had dropped from 81 to 31. This record of successful accident prevention work was partly concealed by the increase in the motor-vehicle death rate from 2 to 21, re-

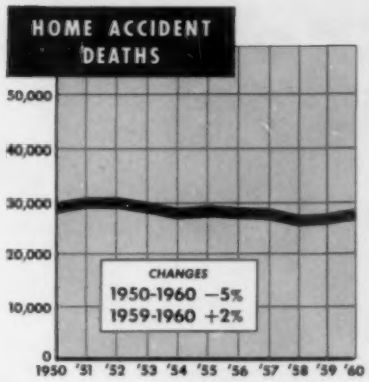
This summary of the accident experience of 1960 is based on *Accident Facts—1961 Edition*, the Council's annual compilation of essential information about accidents.



*Partly estimated.







sulting from the great increase in the use of motor vehicles.

Death totals by age groups in 1960, and changes from 1959, based on the Seventh Revision of the International Statistical Classification of Causes of Death, follow:

Age	1960	1959	Change
0 to 4	8,800	8,748	+1%
5 to 14	6,600	6,511	+1%
15 to 24	13,400	13,269	+1%
25 to 44	19,700	19,666	0%
45 to 64	19,300	18,937	+2%
65 to 74	9,600	9,475	+1%
75 and over	15,600	15,474	+1%

Since the ten years 1903 to 1912 the greatest progress in accident prevention has been made among children under 15 years of age. The 15 to 24 and the 65 years and over age groups have shown the least improvement.

The 1960 death rates per each 100,000 population for every age group are shown below and are compared with the corresponding 1903-1912 rates.

Age	1903-12	1960	Change*
0 to 4	95.0	43.1	−54%
5 to 14	41.8	18.5	−56%
15 to 24	64.6	55.6	−14%
25 to 44	83.2	41.9	−50%
45 to 64	104.1	53.3	−47%
65 to 74	164.5	87.0	−39%
75 and over	525.7	279.4	−37%

*Adjusted for 1948 Revision in Death Classification List.

The latest detailed information available (1959) showed motor-vehicle deaths as 21 per cent of the 0 to 4 age accidental death total and mechanical suffocation deaths as 17 per cent. In the 5 to 14 age group, motor-vehicle deaths were 42 per cent of the total and drownings 21 per cent.

For persons 15 to 24 years old motor-vehicle deaths were 68 per cent of the accidental death total

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THE NATIONAL ACCIDENT FATALITY TOLL

	1960	1959	Change
ALL ACCIDENTS	93,000	92,080	+1%
Motor-vehicle	38,200	37,910	+1%
Public non-motor-vehicle	16,500	16,500	0%
Home	27,500	27,000	+2%
Work	13,800	13,800	0%

Note: The motor-vehicle totals include some deaths also included in the work and home totals. This duplication amounted to about 3,000 in 1960 and 3,100 in 1959. The 1959 all-accident and motor-vehicle death totals are the official figures of the National Office of Vital Statistics; all others are NSC estimates.

DEATHS AND DEATH RATES OF WORKERS BY MAJOR INDUSTRIES, 1960

Industry Group	Total Deaths	Deaths per 100,000 Workers	No. of Workers Per Death
Trade	1,200	9	11,150
Manufacturing	1,700	10	9,700
Service and Govt.	2,800	15	6,700
Trasportation and public utilities	1,600	38	2,650
Agriculture	3,300	58	1,700
Construction	2,400	73	1,400
Mining, quarrying, oil and gas wells	800	123	800

CHANGES IN ACCIDENTAL DEATHS, 1959 TO 1960

Type of Accident	Total Deaths	Deaths 100,000 Persons	Change in rate from 1959
Motor Vehicle	38,200	21.2	−1%
Falls	18,900	10.5	−1%
Fires, Burns	7,300	4.1	+5%
Drowning	6,500	3.6	0%
Railroad	2,450	1.4	+8%
Firearms	2,300	1.3	0%
Poisons (except gas)	1,700	0.9	0%
Poison gases	1,150	0.6	0%

By PAUL E. SHEPPARD
Director, OTJ Safety Activities

Council sends 14,288 questionnaires, receives 1,504 replies on statistical picture of off-the-job programing in 27 industrial sections — plus the human equation, too

NSC Survey Pinpoints Off-the-Job Injury Costs

AVERAGE COST per off-the-job injury was $350.92 among 43 of 283 firms accumulating costs and reporting in a recent NSC Off-the-Job Program Survey. The average cost per day lost because of these injuries was $17.84, and the average cost per employee per year was $9.73. (A study of your own company's expenses might be an effective method in determining whether your operation's costs are this high.)

This survey was divided into two parts: Section I—companies *having* off-the-job safety activities; and Section II—firms *not having* off-the-job programs.

In March 1961 the Council sent 14,288 questionnaires to each of the 27 sections in the NSC Industrial Conference. Of these, 283 companies replied to queries on Section I, and 1,221 firms reponded to Section II questions.

One firm began its off-the-job program in 1922, and the range of the 283 respondents extended from program starts through 1961, with the largest group—52 firms—beginning such activities in 1960, and 18 companies starting off-the-job programs in 1961.

The survey showed the ratio of off-the-job injuries to on-the-job injuries during a five-year period dropped from a high of 4.85 to 1.00 in 1956 to a low of 3.72 to 1.00 in 1959, and in 1960 increased to 4.82 to 1.00.

Fewer than half of the 283 firms replying in Section I have issued a management policy statement on off-the-job safety, but 211 of the 283 companies have offered to provide more facts on off-the-job injuries by sending quarterly reports to the Council.

Most companies in Section I promote off-the-job safety through pamphlet distribution and posters and by putting articles in the company house organ. Other organizations emphasized off-the-job accident prevention in employee meetings, through supervisory talks, in assistance to community groups, letters to workers' homes and in programs to which employee families were invited.

In the 283 firms about 147,673 days were lost in 1956; 349,561 days were lost to the on-the-job mishaps in 1960. Frequency rate in 1956 was 5.95 compared to 6.84 in 1960. The higher rate in 1960 has been attributed to more thorough reporting procedures.

Using the averages mentioned in the first paragraph of this article, the total cost to 43 of the 283 companies reporting in Section I was $2,033,604. Costs in most cases here were determined by a formula based on the average daily wage of the worker times the number of days lost to injury.

Asked "What is the biggest obstacle to expanding your off-the-job safety program—in first, second and third order?" 151 firms laid the primary burden on lack of "time." And 96 companies expressed difficulty in "getting injury reports." At least 91 firms said "cost" was the main problem. Other obstacles listed were: no program material on hand, lack of know-how, employee resentment, management and supervisory apathy.

In-company reports of off-the-job injuries were obtained chiefly from personnel and insurance departments, while other replies came from supervisors, the safety department, and company nurses.

Of the 1,221 companies that re-

	No. of On-The-Job Injuries			No. of Days Lost	No. of Off-The-Job Injuries		No. of Days Lost	Average No. of Emp.
	Reports		Freq.			Freq.		
1960	158	3,396	2.65	349,561	16,378	6.84	394,622	639,640
1959	101	2,869	3.41	237,771	10,690	6.78	278,026	420,966
1958	77	1,652	2.60	89,002	7,385	6.20	201,104	318,132
1957	62	1,848	2.81	209,891	8,156	6.63	277,758	328,807
1956	39	1,264	2.29	147,673	6,139	5.95	183,679	275,448

OFF-THE-JOB SURVEY — 1960 COSTS REPORTED

Report No.	Aver. No. of Emp.	On-the-Job Inj.	Days Lost	Off-the-Job Inj.	Days Lost	Cost Reported	Aver. Cost Per. Inj.	Aver. Cost Per Day Lost	Aver. Cost Per Emp.	Comments on Costs
1.	134,023	258	32,856	2,959	74,587	$1,289,000.	$435.60	$15.90	$8.87	Estimate based on average annual earnings of employees
2.	9,601	33	1,497	326	5,166	52,950.	637.90	10.25	5.51	$10.00 per day pay per employee
3.	7,609	35	1,612	83	3,516	72,503.	874.75	20.62	9.53	Medical, hospital and company benefit costs
4.	5,648	14	437	148	1,911	40,000.	270.20	20.90	7.08	Payments to employees losing time
5.	5,144	11	398	55	2,282	25,694.	467.15	11.20	4.99	66⅔% of non-occupational, accident and death benefits paid plus salary
6.	3,681	36	7,012	97	1,202	23,520.	242.40	19.57	6.39	Average wage times days lost
7.	3,570	14	910	39	1,368	17,593.	451.10	12.86	4.93	Group insurance records
8.	2,829	19	618	111	1,712	84,000.	756.75	49.07	29.69	Average wage times days lost
9.	2,080	44	629	71	1,709	22,445.	316.10	13.13	10.79	Insurance claims paid
10.	2,000	0	0	99	792	7,041.	71.12	8.89	3.52	Insurance and sick benefits paid
11.	2,000	10	108	20	277	32,136.	1,606.80	116.01	16.07	Actual medical and other costs plus insurance costs
12.	1,400	2	108	49	860	6,219.	126.91	7.23	4.44	Salary paid employees
13.	1,250	2	172	89	1,047	2,453.	27.56	2.34	1.96	Cost of treatment in plant dispensary
14.	1,032	1	300	9	203	605.	67.22	2.98	.586	Insurance costs, company doctor costs
15.	901	13	179	49	393	9,039.	184.46	23.00	10.03	Average wages times days lost
16.	860	29	612	25	221	11,050.	442.00	50.00	12.84	Twice average wage times days lost
17.	708	4	2,002	9	194	1,872.	208.00	9.65	2.64	Insurance premium paid
18.	585	20	438	5	508	3,108.	621.00	6.11	5.31	Cost of accident and sickness benefits
19.	534	1	8	10	130	1,677.	167.70	12.90	3.14	Medical and hospital claims
20.	500	0	0	8	348	4,000.	500.00	11.49	8.00	$3,000.00 and 220 days were for one accident
21.	400	0	0	9	115	1,150.	127.70	10.00	2.88	Based on loss of $10.00 per day to company
22.	346	0	0	14	65	1,047.	74.78	16.10	3.03	Paid to employees for time off
23.	310	0	0	13	136	11,462.	881.60	84.27	36.97	Cost for insurance and cost to employee for time lost
24.	299	1	32	19	51	880.	46.32	17.25	2.94	Cost of insurance paid by company
25.	297	1	22	4	280	4,883.	1,220.70	17.44	16.44	Insurance and weekly benefits paid
26.	210	0	0	6	70	1,617.	269.50	23.10	7.70	Wages and salaries paid by company
27.	175	0	0	1	5	50.	50.00	10.00	.286	Direct cost
28.	175	84	4	32	26	2,222.	69.43	85.46	12.70	Insurance claims paid for injuries
29.	172	1	40	9	369	2,340.	260.00	6.34	13.60	Cost of wages and known expenses to employees
30.	102	1	8	14	337	3,761.	268.64	11.16	36.87	Wage loss above paid benefits to employees
31.	98	0	0	4	75	1,650.	412.50	22.00	16.83	Insurance cost to company only
32.	42	4	24	1	10	131.	131.	13.10	3.10	Sick leave payment by company
33.	1,171	10	486	76	1,900	38,000.	500.00	20.00	32.45	Approximate earnings lost
34.	924	1	120	18	255	11,795.	655.27	46.25	12.76	Actual medical expense to company
35.	944	6	474	57	854	4,048.	71.08	4.74	4.29	Social insurance program cost
36.	7,775	25	643	306	5,033	118,275.	386.51	23.50	15.21	Average pay times days lost
37.	700	3	81	14	26	3,016.	215.43	115.44	4.31	Wages plus indirect cost plus work not done — $14.50 per hour
38.	3,466	10	1,057	325	2,004	38,189.	117.50	19.06	11.02	Wages paid for days lost
39.	800	0	0	5	74	1,468.	293.60	19.84	1.83	Computed from sickness and injury insurance
40.	5,472	51	859	570	3,339	80,503.	141.23	24.11	14.71	Daily wage plus employee benefits times days lost
41.	741	15	211	12	306	3,439.	286.58	11.24	4.64	Insurance claims paid
42.	378	3	30	20	228	7,075.	353.75	31.03	18.72	Daily wage times days lost
43.	99	3	42	5	9	101.	20.20	11.22	1.02	Overtime expense paid to fill vacancy
TOTAL	209,051	767	53,759	5,795	113,993	$2,033,604.	$350.92	$17.84	$9.73	

COMPANIES NOT HAVING OFF-JOB PROGRAM

INDUSTRY SECTION	NO. OF SURVEYS		REASONS FOR NOT HAVING A PROGRAM										PLAN TO START A PROG.	
	Mailed Out	Returned	Injury Reports Not Available	Do Not Have Time	Program Is Not Necessary	Do Not Know How to Start	Do Not Have Management Support	Lack of Materials	Cost of Program	Other	Employee Resentment	Community Attitude	Yes	No
Aerospace	350	18	10	5	3	3	9	2	5	1	0	0	2	14
Air Transport	105	9	7	5	2	1	3	2	2	1	0	0	2	7
Auto-Mach. Shop	1,600	94	57	47	31	14	27	21	18	5	6	5	10	72
Chemical	1,300	126	70	55	46	28	22	21	26	8	11	3	11	93
Coal Mining	135	5	3	2	1	0	1	0	0	1	3	1	0	5
Cement Q. & M. A.	435	37	20	11	9	9	3	7	3	3	1	1	5	19
Comp. Motor Veh.	772	126	59	54	45	28	18	21	28	8	5	2	12	74
Construction	510	33	19	12	12	12	9	8	3	4	4	3	0	24
Elec. Equipment	510	40	25	18	11	14	11	12	7	1	4	2	12	22
Food & Beverage	885	45	29	18	19	14	8	9	5	3	3	3	5	35
Fertilizer	188	8	4	5	4	2	0	1	0	0	0	0	2	5
Glass & Ceramics	210	18	11	7	7	2	3	1	3	1	1	4	4	7
Mining	310	30	20	9	10	5	3	4	0	7	3	2	4	17
Marine	241	11	7	1	5	1	2	0	1	3	1	0	1	9
Metals	1,300	126	80	64	49	23	24	22	21	23	15	5	17	85
Meat Packing	152	10	6	7	5	1	0	0	3	3	0	0	0	5
Occ. Health	86	3	2	1	1	1	0	0	0	0	0	0	0	2
Pub. Employee	242	36	22	19	8	7	12	9	11	8	4	3	4	24
Pub. Utilities	1,047	127	71	44	33	43	25	31	11	19	11	7	24	59
Pulp & Paper	1,040	121	68	48	38	32	30	34	16	12	6	5	15	77
Print & Publishing	212	16	9	12	8	2	5	1	1	2	2	1	0	13
Petroleum	750	53	35	21	16	15	10	11	4	8	4	3	12	31
Power Press & Forg.	410	30	14	12	12	8	5	7	7	6	3	2	5	15
Rubber	210	20	6	8	8	3	6	3	3	1	2	1	2	11
Railroad	185	9	8	5	3	1	3	1	3	3	2	2	0	7
Trades & Services	181	6	3	3	1	2	1	1	0	0	1	1	1	5
Textile	392	27	17	6	9	7	2	7	2	7	1	1	5	16
Wood Products	530	37	23	19	15	10	12	5	7	6	0	3	4	27
TOTAL	14,288	1,221	705	515	411	288	254	241	190	144	93	60	159	780

ported on Section II questionnaires as *not* having an off-the-job program, about a tenth said some promotion of interest in off-the-job safety is under way but not as a formal off-the-job activity. These efforts ranged from placing posters, articles in company magazines, and sending information to homes to having company safety meetings on this subject.

Many firms asked for copies of the survey summary, ideas to help develop a program and more specific information that would assist them in considering an off-the-job effort.

In 49 instances the companies were definitely planning such programs at the time of the survey or are planning to start a program in 1962, and 30 respondents said they were preparing a presentation on off-the-job programing for management.

Several companies indicated interest in this type of safety project —if the cost weren't too high. Other comments revealed problems that would *not* allow consideration or starting of an off-the-job program, according to survey participants:

"On-the-job program not doing very well and requires full attention."

"Safety or clerical staff insufficient to handle additional work required for off-the-job program."

"An on-the-job program is being started or revised currently."

Other comments indicating poor possibilities for an off-the-job effort said off-the-job injuries aren't a difficulty because the firm has only a small number of employees, or the records don't show any or many injuries to workers.

Some organizations said flatly that an off-the-job program isn't necessary, and that employees are too scattered or are seasonal, short-time, or daily employees, making an off-the-job program unworkable in the long run.

About 25 firms said off-the-job safety is part of their on-the-job

— To page 121

A NATIONAL SAFETY COUNCIL
TECHNICAL SERVICE

DATA SHEET 508

BORON HYDRIDES

Copies of this data sheet will be available for order within 30 days.

1. Boron hydrides are highly toxic chemical compounds composed of boron and hydrogen. They will react slowly with air. When mixed with air or oxygen, they are extremely flammable and may be subject to spontaneous ignition or explosion. At room temperature, they react with water (hydrolysis) to release hydrogen. This reaction is accelerated at higher temperatures.

This data sheet is one of a series published by the National Safety Council, reflecting experience from many sources. Not every acceptable safety procedure in the field is necessarily included. This data sheet should not be confused with American Standard Safety codes, federal laws, insurance requirements, state laws, rules and regulations, or municipal ordinances.

Physical Properties

2. Some properties of three of the boron hydrides are given in Table I.

3. Diborane hydrolyzes rapidly in water and is soluble in some hydrocarbons. Pentaborane hydrolyzes slowly in water and is miscible with most hydrocarbons. Decaborane hydrolyzes slowly and is soluble in certain organic solvents, such as butane, pentane, hexane, heptane, ethyl acetate, ethyl silicate, carbon disulfide, benzene, acetic acid, ethyl borate, caprylic acid, and cyclohexane. It will form water-soluble addition products with ammonium hydroxide and with amines.

4. The boron hydrides are compatible with most metals and will not corrode them. However, these compounds affect nearly all rubber and plastics, except materials such as Teflon and Kel-F. Table II lists some materials that are acceptable for use in the construction of containers and other articles that will be exposed to boron hydrides.

5. The *Liquid Propellant Safety Manual** describes the properties of alkyl boranes as being substantially the same as the properties of the materials from which they are made, especially in regard to toxicity and fire hazard.

Uses

6. The boron hydrides have physical and chemical properties which make them suitable as intermediates in the production of fuels. Since their ranges of flammability are generally wider than those of hydrocarbons, they permit air breathing engines to operate at higher altitudes.

7. Future markets for the boron hydrides as reducing agents, fuel intermediates, and polymerization catalysts are predicted.

Hazards

8. All the boron hydrides are highly toxic by inhalation, by absorption through the skin, or by ingestion. The vapors are corrosive to the eyes.

9. The fire hazard presented by the boron hydrides ranges from severe to serious. Because of their wide range of flammability and the flame speeds which may be encountered, these materials also constitute a severe explosion hazard. All of them will react explosively with most oxidizing agents, including most halogenated hydrocarbons. Shock sensitivity tests have indicated that a solution of decaborane in carbon tetrachloride is more sensitive to shock than is nitroglycerin.

Shipping Regulations

10. Since diborane and pentaborane decompose slowly but spontaneously with the evolution of hydrogen, the boron hydrides are shipped only under special Interstate

**Liquid Propellant Safety Manual*, The Liquid Propellant Information Agency, Advisory Panel on Fuels and Lubricants, Office of the Assistant Secretary of Defense, Research, and Engineering, Washington 25, D.C., 1958.

TABLE I. PROPERTIES OF THREE BORON HYDRIDES

Chemical name:	Diborane	Pentaborane	Decaborane
CHEMICAL FORMULA:	B_2H_6	B_5H_9	$B_{10}H_{14}$
PHYSICAL STATE AT NORMAL TEMPERATURE AND PRESSURE:	Colorless gas	Colorless liquid	White rhombic crystals
ODOR:	Sickly sweet — nauseating	Unpleasant	. . .
ODOR THRESHOLD:	2 to 4 ppm (2 to 4 mg/m³)	1 ppm (2.5 mg/m³)	0.07 ppm (0.35 mg/m³)
MOLECULAR WEIGHT:	27.7	63.2	122.3
BOILING POINT:	−134.5 F (−92.5 C)	137.1 F (58.4 C)	413.6 F (213 C)
MELTING POINT:	−264.7 F (−164.9 C)	−52.3 F (−46.8 C)	209.8 F (98.8 C)
VAPOR PRESSURE:	22 mm at −170 F (−112 C) 760 mm at 15.2 F (− 9.3 C)	66 mm at 32 F (O C)	Approximately 66 mm at 269.6 F (132 C)
DENSITY:	0.95 (air = 1)	2.18 (air = 1) 0.630 at 60.8 F (16 C) (water = 1)	0.94 (water = 1)
AUTOIGNITION TEMPERATURE:	293 F (145 C)	Room temperature	Approximately 300 F (149 C)
FLASH POINT:	. . .	Spontaneous	Approximately 176 F (80 C)
EXPLOSIVE LIMITS:	0.8 to 98%	Undetermined, but approximately same as those of diborane	Essentially over much of the range of diborane

Commerce Commission permits or regulations.

11. Diborane is shipped as a flammable compressed gas by railway express in compressed gas cylinders filled to a 14 per cent filling density if the shipment can be completed in 5 days and a 7 per cent filling density if the shipment can be completed in 10 days. A special ICC permit is required for shipment.

12. Pentaborane is shipped in accordance with T. C. George's Tariff No. 13 (paragraph 73.138).*

13. Decaborane is shipped as a flammable solid in accordance with T. C. George's Tariff No. 13 (paragraphs 73.150 and 73.154).*

**Agent T. C. George's Tariff No. 13, Publishing Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles by Land and Water in Rail Freight, Express and Baggage Services and by Motor Vehicle (Highway) and Water, including Specifications for Shipping Containers,* 63 Vesey Street, New York 7, N.Y.

Storage

14. Storage areas for the boranes should be so located that natural ventilation will not introduce a serious hazard to inhabited areas in case of a leak or a spill. The storage area should be paved to eliminate the possibility of soil contamination from leakage.

15. Areas in which boron hydrides are stored must be considered hazardous locations and must conform to the requirements of Section 500 of the *National Electrical Code.**

16. Only spark-resistant tools should be used in the storage areas. *No Smoking* signs, along with other appropriate warning signs, should be conspicuously posted. If leakage of boron hydrides should occur, only properly protected personnel should remain in the area.

*Standard No. 70, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.

17. The boranes may be stored in the containers in which they are shipped or in properly constructed storage tanks or vessels. Pentaborane storage tanks require a dry inert atmosphere of nitrogen at all times. Since diborane decomposes slowly under ambient conditions, it is recommended that it be stored refrigerated at 0 F to maintain high purity and to prevent the formation of solid decomposition products in the storage tank. All containers should be protected from the weather and from the direct rays of the sun.

18. The latest revision of the Army *Ordnance Corps Manual** should be used as a guide for the storage of large amounts of the boranes. Recommended distances to be maintained from various

**Ordnance Corps Manual,* ORD M 7-224 (Ordnance Safety Manual), Ordnance Corps., Department of the Army, 1951. Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

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CIRCLE 25 ON READER CARD

TABLE II. ACCEPTABLE CONSTRUCTION MATERIALS

Metals	Nonmetals
Steel	Teflon-impregnated asbestos
Copper tubing	Kel-F No. 5500
Some aluminum alloys	Kel-F with glass yarn (multiple laminate)
Some magnesium alloys	Kel-F elastomer
Monel	Nylon
Hastelloy	Viton A
Nickel	
Inconel	
Some titanium alloys	
Pure carbon	

amounts of stored boranes are given in the "Class 950 Quantity-Distance" tables in the manual.

Handling

19. Tanks and auxiliary equipment, such as lines and valves, which have contained boron hydrides must be thoroughly cleaned before repairs are undertaken or maintenance work is done on a vessel or system. Each piece of equipment should be thoroughly flushed with an inert hydrocarbon such as *dry* kerosene and then be cautiously steamed out in place by making hose connections to the equipment and introducing the steam from a remote location. If steam is not introduced cautiously, solids in a system may react violently and exothermically.

20. Systems must have large vents open to the atmosphere, preferably through a scrubber, while this steaming operation is taking place. After steaming has been completed, the systems must be flushed with an inert gas such as nitrogen to remove the hydrogen formed.

21. Because the boron hydrides are highly flammable and highly toxic, it is advisable to locate all vessels and equipment containing these compounds outdoors with the process controls arranged for remote operation.

22. If equipment must be placed indoors, well-ventilated, segregated cells should be provided. A minimum face velocity of 100 feet per minute should be provided in laboratory hoods. All construction should be fire-resistant with a minimum rating of 2 hours.

23. Each inside area must have at least two means of egress, with no portion of the area more than 75 feet from one of the exits. The exit doors should open outward and should be of approved type, as covered in NFPA Standard No. 101, *Building Exits Code*.* In process areas, venting through the wall or the ceiling or both is advisable to minimize explosion damage.

24. Closed systems are mandatory for processes or systems in which the boron hydrides are handled. Equipment must not be opened until it has been thoroughly purged and inerted.

25. The flammable properties of the boron hydrides require a highly specialized design in piping and equipment. Equipment and ventilating systems should be designed and operating procedures should be formulated by experienced engineers and safety and fire protection specialists.

26. No heating apparatus capable of reaching the autoignition temperature of any of these compounds should be used in connection with them unless it is properly shielded. Automatic temperature controls are recommended for processes in which the boron hydrides are heated, but even in this case close supervision is necessary. Heated inert gases or mineral oil heat transfer systems are recommended for heating these materials.

27. A monitoring device for boron hydrides to locate the sources of small leaks is available commercially. Its use during periodic inspections is recommended.

28. This device operates on the principle of drawing a definite volume of air through filter paper wetted with reagent which changes color in the presence of a boron hydride. The instrument has a de-

*"National Fire Codes," Vol. III, *Building Construction and Equipment*, National Fire Protection Association.

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This new film series was written and produced with the individual employee in mind. Each of the three films discusses his individual responsibility for safety, his role in accident prevention, his stake in the safety program. If you're looking for a training tool that will reach your people with convincing arguments for a more personal interest in safety — then this new 3 film series, SAFETY WISE, is for you!

*The National Safety Council's new training film series for workers in all industry.

These 3 new, unusual, interesting and often humorous films feature animated cartoons combined with live action to dramatize and personalize safety for the industrial worker

1 171.76 — SAFE AS YOU KNOW HOW

This film depicts the story of Marty McYou, an average guy. He's upset because it seems everyone is an expert but him. The film points out he is an expert—in his job and on safety. It illustrates how knowing . . . and then doing something about safety is important to him, his company and his family.

2 171.77 — NOT EVEN ONE CHANCE

In this film the audience meets J. T. O. Uust This Once) Jones. He's the fellow who takes chances and often gets into danger and trouble. The film plays heavily on the danger of this attitude and why it's important to change it. At the end of the film J. T. O. decides to change his motto to N. E. O. (Not Even Once).

3 171.78 — HELP YOURSELF TO SAFETY

A pointed training film about George Griswold. He's the fellow that has a head full of safety facts but nevertheless still has an accident. This is an excellent film in overcoming the personal "blind spots" employees develop about their own relation to the overall safety plan.

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tection sensitivity to 0.1 to 3 ppm (parts per million parts of air) of diborane, 0.01 to 1 ppm of pentaborane, and 0.01 to 1 ppm of decaborane.

29. Diborane containers must be emptied carefully so that the pressure on the cylinders is not reduced below 20 psig, in order to maintain a positive pressure to prevent contamination with air during shipment.

30. A dry inert gas such as nitrogen should be used to pressure the material out of cylinders containing pentaborane.

Training of Employees

31. Safety in the handling of boron hydrides depends to a great extent upon effective employee education, intelligent supervision, and consistent use of safety equipment. *Training classes for both experienced and inexperienced employees should be conducted periodically to maintain a high degree of safety in handling procedures.*

32. Workers should be informed of the hazards to which they may be exposed and should be cautioned to avoid contact with the materials. They should be instructed as to what constitutes a toxic exposure, the symptoms of such exposure, and the proper action to take in the event exposure occurs. They must realize that the vapor pressures of the boron hydrides are high enough to cause the formation of dangerously toxic concentrations at room temperature.

33. Each employee must be instructed in emergency and first-aid procedures. All employees should be thoroughly familiar with the purpose, location, and use of emergency fire protection and fire fighting equipment, fire alarms, and emergency crash shutdown equipment, such as valves and switches. They should know the locations of safety showers, eye baths, and the closest source of water for use in an emergency. They should be acquainted with decontamination procedures to be used in case of a spill.

Personal Protective Equipment

34. Since exposure to boron hydrides or contact with them cannot be prevented entirely even with expert engineering procedures, person-

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al protective equipment must be provided.

35. Chemical-type goggles, or their equivalent, should be used where continuous eye protection is needed, as in laboratories. Plastic face shields (8-inch minimum length) with forehead protection should be worn in addition to safety glasses when employees are taking samples.

36. Mechanical respirators should not be used as protection against even minimum concentrations of the boron hydrides. A canister mask will give adequate protection against low concentrations during a limited period. The canister should contain silica gel, hopcalite, and activated charcoal.

37. Use of a combination supplied-air canister mask is recommended for all areas where large amounts of materials are processed or stored. A type of self-contained breathing apparatus* or a hose mask with blower* should be used in high concentrations.

38. Personnel who work with boron hydrides should be provided with impervious coveralls. Neoprene-dipped gloves and boots are recommended, and some type of head covering is needed.

39. Rubber or neoprene shoe coverings should be used where there is a chance of foot contamination. Hydrides or solutions will be absorbed readily by leather, which is difficult to decontaminate. Although rubber and neoprene coverings will be attacked by high concentrations of the hydrides, they will give adequate protection for emergencies and can then be discarded.

Decontamination

40. All protective equipment should be decontaminated after use and carefully examined before it is used again. It is imperative that contaminated clothing be laundered before it is worn again. It should not, however, be sent directly to a commercial laundry, but should first be decontaminated in the plant.

*Only equipment that is approved by the U. S. Bureau of Mines, Washington 25, D.C., should be selected for use.

41. Clothing, equipment, laboratory glassware, and the like can be decontaminated by use of a 3 per cent aqueous solution of ammonium hydroxide or by 1 to 5 per cent aqueous triethanolamine. The boron hydrides will combine with these chemicals to form water-soluble products which can be readily flushed off with water. The water solvents of these additional products are still highly toxic and, therefore, must be disposed of with care.

42. Personal protective equipment specified for processing exposures, including eye and respiratory protection, must be worn by employees who perform decontamination procedures.

Electrical Equipment

43. In areas where boron hydrides are stored, used, or handled, all electrical equipment, including ventilators and accessory wiring, should be installed as prescribed in Section 500 of the *National Electrical Code*, Standard No. 70, National Fire Protection Association.

Fire Control

44. Boron hydride fires are severe and difficult to extinguish by ordinary means. An inert medium such as nitrogen can effectively control these fires only in small confined spaces. Carbon dioxide is not a suitable inerting medium since at high temperatures it can become a source of oxygen.

45. The recommended procedure to control diborane fires is to apply a water spray. However, such fires should under *no condition* be extinguished until the source of diborane can be shut off. If escape of the diborane is not stopped before extinguishment, unburned gas can collect in the air. Diborane has wide explosive limits, and even a small amount of it will form a highly explosive mixture with air which can be detonated by a spark or mild heat.

46. Decaborane fires, while difficult to control, can be extinguished more easily than either diborane or pentaborane fires. The recommended procedure for decaborane fires is to smother them with an inert medium such as sodium bicarbonate, salt, or graphite. Vaporizing liquid extinguishers such as

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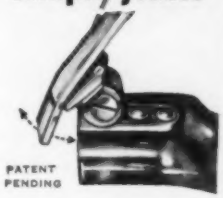

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carbon tetrachloride and chlorobromomethane should *never* be used on decaborane fires since halides will react violently with boron hydrides.

47. Since pentaborane is spontaneously flammable and reacts with water, fires involving this compound are especially difficult to extinguish. Pentaborane fires can be controlled by the same measures taken to extinguish decaborane or diborane fires.

48. Personnel engaged in fighting boron hydride fires should wear U. S. Bureau of Mines approved self-contained breathing apparatus and fire-resistant clothing.

49. The products of combustion of the boron hydrides may be as toxic as the original materials or even more toxic. After all fire fighting activities have ceased, personnel should thoroughly bathe with water and an amine base soap. Clothes used during the fire fighting should be decontaminated and laundered before being worn again.

Symptoms of Poisoning

50. Exposure to high concentrations of diborane chiefly affects the lungs, causing pulmonary edema (filling with fluids), congestion, and hemorrhage. Symptoms of acute exposure are sensations of tightness, heaviness, and burning in the chest; shortness of breath; nonproductive cough; and pain in the area of the chest overlying the heart.

51. Symptoms of chronic exposure to low concentrations of diborane may be headache, lightheadedness, dizziness, chills and fever, fatigue, and muscular weakness. Occasionally, localized tremors of short duration may occur.

52. If an employee experiences shortness of breath upon exertion, either at work or at home, he should report this condition to the industrial physician at once and should refrain from further exertion until a medical examination, including a chest X-ray, can be made to rule out pulmonary edema.

53. Exposures to pentaborane and to decaborane result in similar symptoms: headache, dizziness, and often hiccoughs. Drowsiness, forgetfulness, and nausea after meals generally follow, with pronounced nervousness and involuntary muscular contractions occuring somewhat later.

54. Appearance of symptoms may be delayed for as long as 48 hours after exposure to pentaborane or decaborane. Lack of coordination, lack of ability to concentrate, muscular fatigue, and pain or cramps in the arm, neck, back, or thigh muscles are common. Spasms of the abdominal muscles sometimes occur. In most cases, confusion, inability to concentrate, and severe headaches are protracted.

First Aid

55. First aid for exposure to the boron hydrides consists primarily of removing the person from the exposure and keeping him dry, warm, and at rest until he can be placed under the care of a physician designated to be called in such emergencies. Contaminated clothing should be removed, and affected areas of the body should be washed thoroughly with 1 to 5 per cent aqueous triethanolamine or with a 3 per cent aqueous solution of ammonia hydroxide, followed by soap and water.

Toxicity

56. Diborane is primarily hazardous by the route of inhalation. Small concentrations affect principally the respiratory or pulmonary system. In larger concentrations, it may also affect the central nervous system and, in cases of severe exposure, can cause edema of the lungs and even death. No cumulative effects have been noted to date.

57. Personnel must be instructed to report any possible symptoms of exposure to diborane to the medical department without delay. Working conditions can then be investigated before a serious exposure develops. Chest X-rays may show infiltration consistent with pulmonary irritation.

58. In a case of severe acute exposure, the person affected may be given positive pressure oxygen to reduce the possibility of pulmonary edema. This treatment should be given only upon a physician's orders and under his direction.

59. Pentaborane produces symptoms largely referable to the central nervous system. Decaborane also affects the central nervous system,

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but its toxicity is less than that of pentaborane. Clinical symptoms are an excellent indication of overexposure. A simple, specific clinical test for boron hydride exposure has been developed.*

Threshold Limit Values**

60. Diborane has a threshold limit value of 0.1 ppm, and the median concentration detectable by odor is 3.3 ppm.

61. The atmospheric concentration of pentaborane must be kept as near zero as possible. It has a tentative threshold limit value of 0.005 ppm. The median concentration detectable by odor is 1 ppm.

62. Decaborane has a threshold limit value of 0.05 ppm, and a median concentration detectable by odor of 0.07 ppm.

Waste Disposal

63. Small amounts of boron hydrides may be hydrolyzed and flushed down the sewer. Larger amounts should not be disposed of in this manner since the hydrolysis may occur slowly enough to cause a sewer explosion or subsequent water contamination. Larger amounts must be collected and disposed of by incineration.

64. The waste water solutions from the decontamination process must be disposed of with care since the water solvents of the addition products formed during the process are highly toxic.

---

*"A Simple Clinical Test for Boron Hydride Exposure," *WADC Technical Report* 59-123, ASTIA Document No. AD 213593, F. Miller, Capt., USAF (MC), A. Tamas, M.D., and L. Robinson, A/2C USAF, Aero Medical Laboratory (1959).

**The term "threshold limit value" as used here is synonymous with the commonly employed term "maximum acceptable concentration." The threshold limit values given in paragraphs 60 through 62 were adopted by the American Conference of Governmental Industrial Hygienists in 1960, and are based on eight hours of exposure.

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ACKNOWLEDGMENT

The original draft of this data sheet was prepared by H. A. Volz, Safety Director, Callery Chemical Co. Content has been extensively reviewed by members of the National Safety Council and by representatives of chapters of the American Society of Safety Engineers. The data sheet has been approved for publication by the Publications Committee of the Industrial Conference of the National Safety Council.

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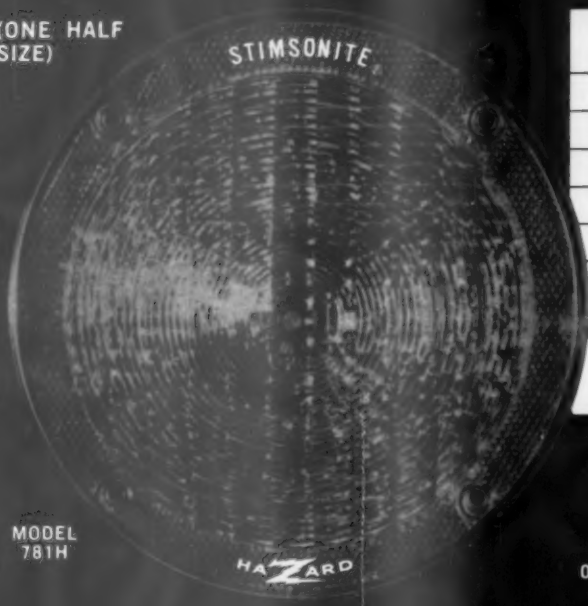

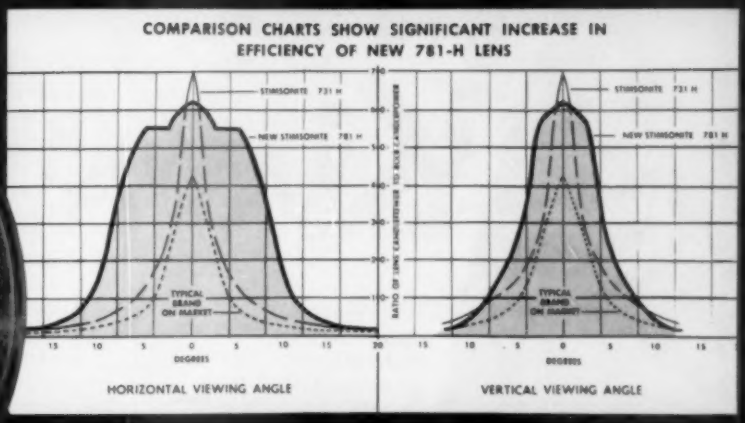
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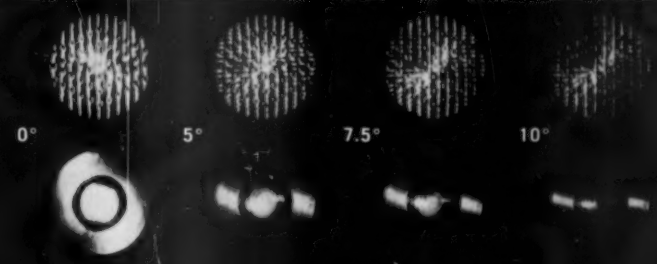

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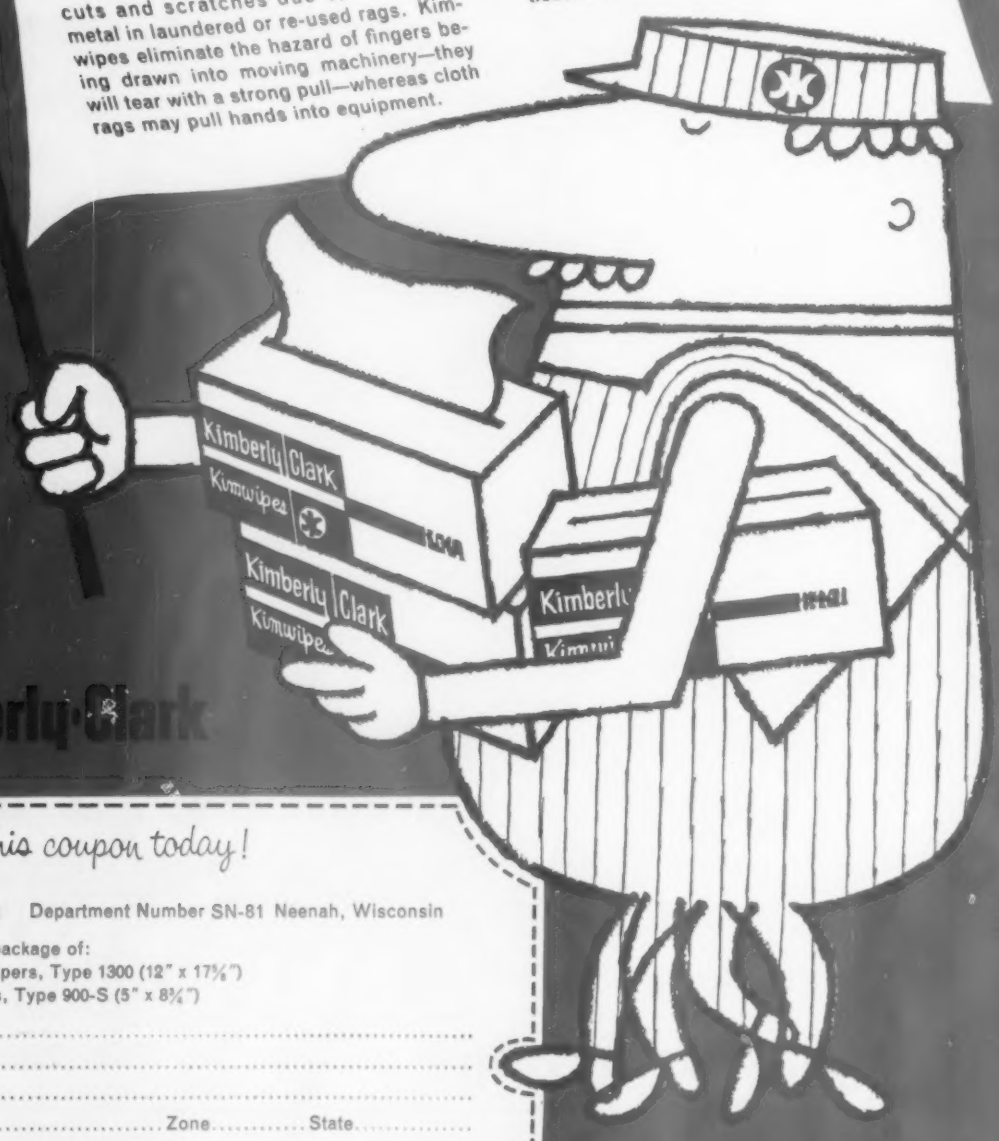

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WIRE from WASHINGTON

By HARRY N. ROSENFIELD
Washington Counsel
National Safety Council

AFL-CIO Stresses Physical Safety

IN INDUSTRIAL SAFETY a record low rate of work injuries in manufacturing plants was reached for the first quarter of 1961, according to the U.S. Bureau of Labor Statistics. The rate of 10.4 per million man-hours worked was 6 per cent below the comparable 1960 injury-frequency rate, and tied the previous low rate for any quarter of the year.

Of the 131 classifications, 50 industries showed a decrease of one full frequency-rate point or more between the first quarters of 1960 and 1961, while 21 industries showed increases.

The greatest improvement was shown by the logging industry with a rate of 50.5 in 1961's first quarter, compared with 60.7 in 1960.

House consideration of H.R. 5741, to extend the applicability of the Federal Coal Mine Safety Act to mines hiring fewer than 14 workers underground (See "Wire," June 1961), was blocked by the action of the rules committee which refused to schedule the bill for House action.

The U.S. Bureau of Mines reissued, for public comment, substantially revised proposed regulations for tests and certification of methane-monitoring systems to be incorporated into permissible equipment for gassy mines and tunnels.

The World Health Organization, an arm of the United Nations, issued a report stating that heavy smog may cause lung cancer and increase deaths from heart disease.

The AFL-CIO held the second session of its National Safety Training Institute, emphasizing mechanical and physical safety. Later sessions will take up chemical and environmental safety, including radiation, and teacher training in safety.

Both houses of the Congress passed H.R. 6441, to amend the Federal Water Pollution Control Act for a more effective program of water pollution control, but in each case in somewhat different form. A conference committee will have to iron out differences between the two houses. (See "Wire," February and April 1961).

The Joint Committee on Atomic Energy held hearings on radiation safety and regulation, and gave consideration to current developments on safety aspects of the handling of radioisotope materials and the building and operation of nuclear reactors.

A member of the Advisory Committee on Reactor Safeguards testified: "I would be unwilling to predict that even in 10 years the reactor will have progressed so far that you would be willing to place such facilities of high power in heavily populated areas."

Another scientific expert told Congress: "I do not believe absolute safety can ever be claimed. I believe what can and is being done is to reduce the probability of serious hazard to the public to a low enough value so the risks are comparable to other risks found acceptable in our society."

This congressional committee also inquired into the facts surrounding

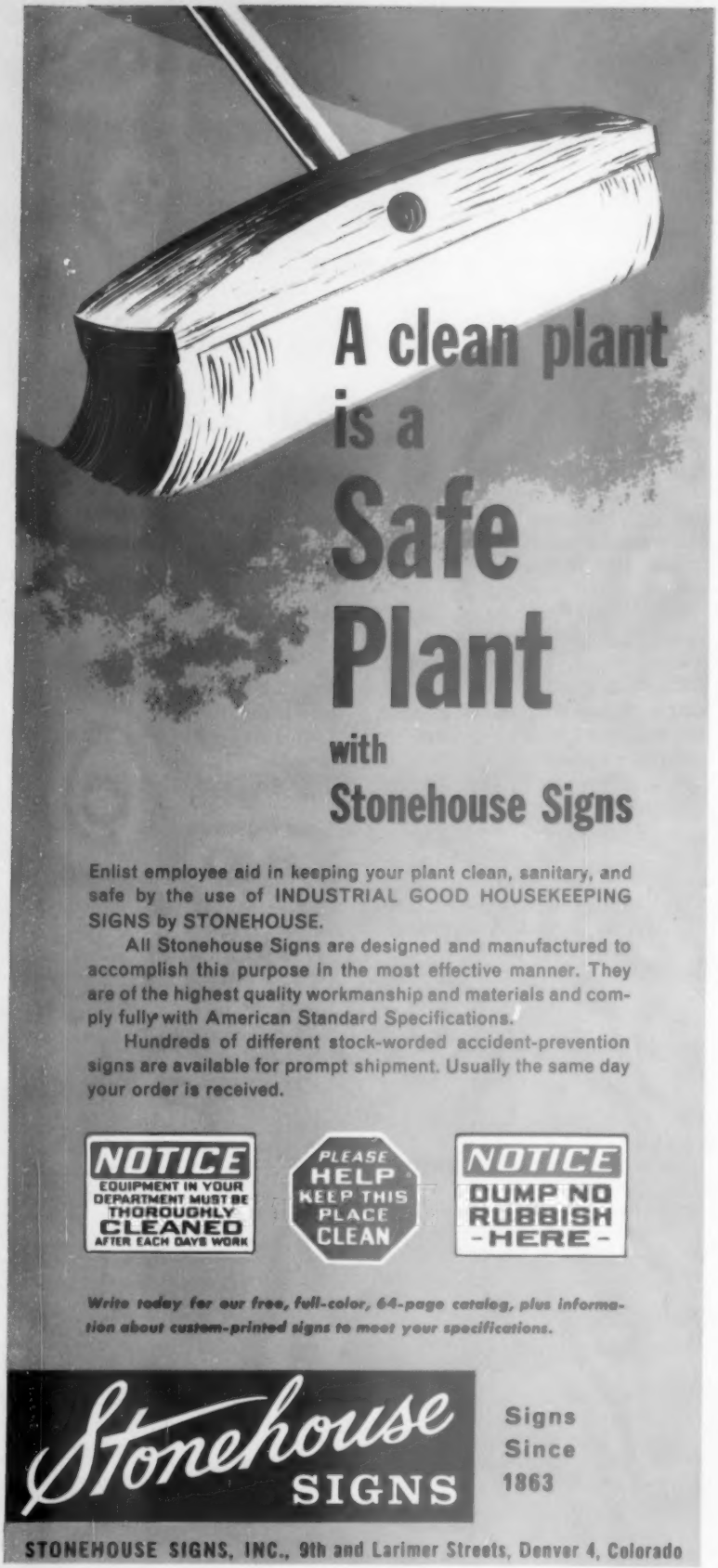
THIS MONTH IN WASHINGTON

Record low rate of work injuries in manufacturing plants shown in first quarter of 1961. Rate of 10.4 per million man-hours worked was 6 per cent below comparable 1960 injury-frequency rate. Of 131 classifications, 50 industries drop one full frequency-rate point or more between first quarters of 1960 and 1961, while 21 industries show increases. Logging industry drops most — from 60.7 in 1960 to 50.5 in 1961.

AFL-CIO holds second session of National Safety Training Institute, emphasizing mechanical and physical safety. Later sessions to take up chemical and environmental safety — including radiation — and teacher training in safety.

US Supreme Court rules AEC could permit private utility to build power plant near metropolitan area without AEC first making definitive safety finding. Such finding could be delayed until after plant was built but before it would be permitted to operate.

This report is an information service. Publication does not imply National Safety Council approval of or opposition to any legislation mentioned.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the Idaho reactor accident (See "Wire," March 1961). The Atomic Energy Commission's testimony revealed a design deficiency in the reactor, deficiencies in safety procedures of the AEC and its contractors, lack of provision for an operator at the controls at all times, and failure of independent and periodic safety reviews.

The AEC assumed responsibility for the accident, and said the accident could have been avoided. The Commission outlined new procedures and corrective actions to assure future safety in facilities of the AEC and its contractors. Testimony before the joint committee also covered the revision of AEC's regulatory organization, as it affects safety.

The AEC opposed the plan of the joint committee's staff for a complete separation of safety and licensing functions from development and promotional programs (See "Wire," May 1961), stating its present internal separation of functions would adequately accomplish necessary objectives for the present.

The U.S. Supreme Court upheld the AEC's procedures for authorizing the construction and the operation of nuclear power plants. The AEC argued that, so long as safety was assured prior to operation, construction could be authorized without a definitive safety finding.

The suing unions claimed the economic pressure to authorize operation of an expensive plant already built would overrule safety considerations.

By a 7-2 decision, the Court ruled the AEC could permit a private utility to construct a power plant near a metropolitan area without the AEC's first making a definitive safety finding. Such finding could be delayed, as the AEC planned, until after the plant was constructed but before it was permitted to go into operation.

The Court said it could not assume the AEC would ignore its duty to protect the public safety, and that the two-step process intended by Congress was valid whereby the AEC could "defer a definitive safety finding until operation is actually licensed. What is up-to-date now may not, probably will not, be acceptable tomorrow. Problems which seem insuperable

now may be solved tomorrow, perhaps in the very process of construction itself."

Dissenting judges claimed the AEC's two-step process was "a light-hearted approach to the most awesome, the most deadly, the most dangerous process that man has ever invented."

The AEC initiated a testing program to develop a technical basis for safety performance of isotope sources and devices, to assure containment of the materials and minimal risk of dispersal or biological absorption.

The Joint Committee on Atomic Energy also held public hearings on the AEC Indemnity Act.

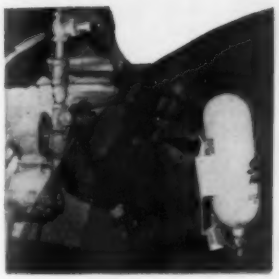
Traffic Safety. Congress passed, and the President signed into law as Public Law 87-61, the Federal-Aid Highway Act of 1961, to provide for the completion of the interstate highway system as originally authorized by the highway act of 1956, through authorizing a firm program of annual appropriations for apportionment to the states.

The Congress also approved and the President signed into law as PL87-70, the housing bill, which includes these authorizations: $25 million of urban renewal funds for federal grants to local agencies to cover two-thirds of the cost of pilot mass-transportation demonstration projects; $55 million for mass transportation studies and surveys by states and localities, as part of the urban planning program, with advance blanket approval given to interstate compacts for joint planning projects by more than one state; and $50 million for low-interest loans to metropolitan agencies for construction and equipment of mass-transportation systems, this authority to contract terminating Dec. 31, 1962.

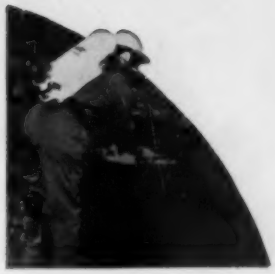
The Senate passed S. 1440, providing technical amendments to the driver register act to enable additional states to participate in the program. The Secretary of Commerce announced the official inauguration of the National Driver Register Service on July 1, 1961, as a purely voluntary, cooperative state-federal enterprise.

Commercial Transportation. The AEC is paying special attention to the transportation of radioactive mate-

— *To page 58*



FRESH AIR



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CIRCLE 21 ON READER CARD

Your Session Schedule

for the 1961 National Safety Congress and Exposition October 16-20, Chicago

ALTHOUGH THE CONGRESS will last for 4½ days, you can attend only so many sessions. This schedule will enable you to make the best use of your time at this valuable series of safety meetings.

The *Preliminary Edition* of the printed Congress program will be mailed the latter part of August. The *Final Edition* will be distributed at the time of registration by Congress participants.

DATE AND HOTEL ASSIGNMENTS

SECTIONAL SESSIONS	HOTEL	Oct. 16 Monday am	Oct. 16 Monday pm	Oct. 17 Tuesday am	Oct. 17 Tuesday pm	Oct. 18 Wednesday am	Oct. 18 Wednesday pm	Oct. 19 Thursday am	Oct. 19 Thursday pm	Oct. 20 Friday am
Aerospace	Hilton		X						X	
Air Transport	Hilton				X					
Auto. and Mach. Shop	Pick-Congress				X		X			
Cement and Quarry	Hilton				X		X			
Chemical	La Salle		X		X		X		X	
Coal Mining	Hilton		X		X		X			
Commercial Vehicle	La Salle			X	X	X	X	X	L	
Construction	Hilton		X		X		X			
Electrical Equipment	Hilton						X		X	
Fertilizer	Pick-Congress		X		LX					
Food and Beverage	Sheraton		X		LX		X		X	
Glass and Ceramics	Pick-Congress		X		X		X			
Marine	La Salle		X	X	X	X	X	X	LX	
Meat Packing, Tng. and L.	Pick-Congress		X		LX					
Metals	Hilton		X		X		LX		X	
Mining	Pick-Congress		X		LX		X		X	
Occ. Health Nursing	Hilton and Congress			X		X	L			
Petroleum	Hilton		X		X		X		X	
Power Press and Forging	Pick-Congress				X		X		X	
Printing and Publishing	Hilton				X					
Public Employee	Hilton		X		X		X		X	
Public Utilities	Hilton						X		X	
Pulp and Paper	Hilton		X		X		X		LX	
Railroad	La Salle				X		X		X	
Rubber	Hilton		X	X	LX					
Textile	Essex House				X		X			
Trades and Services	Pick-Congress		X		X		X			
Transit	La Salle			X	X	X	X	X	L	
Wood Products	Pick-Congress		X		X		X		LX	
DIVISIONAL SESSIONS										
Farm	Palmer House			X	X	X	X			
Home	Hilton			X		X		X		
Labor	Hilton			X		X		X		
Public	Hilton		X		X		X	X	X	
Religious	Hilton		X	X						
School and College	Hamilton		X	X	X	X	X	X	LX	
Traffic	Pick-Congress		LX	X	X		X	X		
Women's Activities	Blackstone					X	X			
Youth	Hamilton		X	X	X	X	X			
A.S.S.E. — SUBJECT SESSIONS										
A.S.S.E. Ann. Mtg.	Hilton	X			L					
Subject Sessions	Hilton, Pick-Congress and LaSalle			X		X		X		
GENERAL SESSIONS										
Annual Council Mtg.	Hilton	X								
Banquet	Hilton				X-Eve.					
Early Morn. Sess.	Hilton			X		X		X		X
Films	Hilton						X-Eve.			

(L Luncheon)

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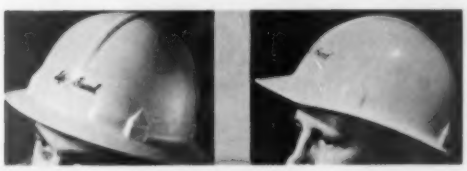

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SOUTH HAVEN, MICHIGAN

Wire

— From page 55

rials. It said that "safety in this transportation is largely dependent upon the proper design of shipping containers to assure that external radiation levels are kept within safe limits, and that containers are designed and constructed so that they are not likely to rupture and release their contents."

The AEC is drafting amendments to its regulations "to establish more definitive and comprehensive standards for safe shipment of special nuclear materials." The Commission also announced it was "undertaking a program of educating carriers on physical characteristics and on safe methods and procedures employed in the transportation of radioactive materials."

The deadline has passed for compliance with an Interstate Commerce Commission regulation requiring buses and trucks in interstate commerce to have equipment providing for simultaneous flashing of front and rear-turn signals in event of a breakdown on the road.

The ICC also conducted an extensive road safety check of motor vehicles carrying migrant workers north, to help assure safe transportation for these workers.

In various motor-carrier accident investigation reports, the ICC called attention to possible criminal prosecutions for failure of motor carriers to provide proper inspection and maintenance of their vehicles, and the need for education of drivers in the proper parking of vehicles to avoid their rolling away while unattended.

Aviation Safety. The U.S. Supreme Court declined to review a decision of a Federal Court of Appeals which sustained the federal aviation administrator's order establishing 60 years as the maximum age for airline pilots. The federal aviation administrator announced he planned to continue the rule sustained.

The FAA has signed a contract with the Flight Safety Foundation to develop a pilot reporting program for obtaining data on near-miss mid-air collisions; the analysis of incident patterns, said FAA, will be interpreted as they relate to engineering and flight operations factors, and the information obtained will be confidential and not used for punishment of pilots involved.

The FAA also has changed base inspections of air taxi service from every 60-day period to once every six months.

Maritime Safety. One of its members informed the House of Representatives that 39 states have enacted numbering systems approved by the U.S. Coast Guard under the Federal Boating Act of 1958.

In 1960 a total of 2,450,484 boats were numbered under this act.

Coast Guard statistics indicate 41 per cent of the accidents reportable under the act occurred from June through the Labor Day weekend in 1960.

The Coast Guard amended its regulations concerning specifications for buoyant cushions, the repairing and cleaning of life preservers, and hatchets for merchant vessels.

The Senate passed S. 1668, authorizing the Federal Communications Commission to impose small fines, instead of requiring license revocation, for certain violations of its rules and regulations in the common carrier and safety and special frequencies.

Among the reasons for this bill, sponsored by the FCC, is the misuse of the distress frequency by small boats, according to the Senate committee's report.

Public Safety. Under the Food Additives Act, the Secretary of Health, Education and Welfare revised regulations recognizing as generally safe for their intended use a list of substances used in food packaging.

The Food and Drug Administration held a hearing under the Hazardous Substances Act, to allow the public presentation of views on requirements under the act.

The Federal Communications Commission issued notice of a proposed rule-making proceeding inviting comments on a proposal of the International Association of Fire Chiefs and the International Municipal Signal Association for a modification of regulations to allow coordinated operation of fire radio service systems.

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OCTOBER 16-20

49th

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INDUSTRIAL MARKETING DIVISION
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ESB

Diary

– From page 7

ture, and our organizational charts. Lee also briefed him on our general way of proceeding. Sometime after lunch, Lee turned him over to Bert, and Bert took him for a tour of the Project, with instructions to do some inspecting along the way.

As soon as Bert and Joe left, Lee said to me, "Boss, the kid doesn't know anything about statistics." I told Lee I'd noted he hadn't gotten good grades in statistical courses.

Lee shook his head – "It isn't that he's slow on operations," he said. "I haven't checked him out on that. But he doesn't have the foggiest idea what statistics mean and don't mean. Yet he'll look at a table or chart, point to some figure or trend, and make some comment that's nonsense. And he won't listen to explanations."

"Well," I said, "give the boy time. Not everybody comes by statistical knowledge quickly."

Lee gave up on me after that, except to mutter that even Bert, who didn't know a trend from an average when he came on the job, didn't pretend to make dogmatic judgments when he didn't understand what figures meant.

I wondered if Lee might not be a little harsh, perhaps a little jealous, but I said I'd work with the boy.

An hour later Bert and Joe returned, Joe bubbling with good spirits and spraying off blythe comments about the excitement of really being a part of industry for the first time.

Bert, on the other hand, was glowering. Finally he blurted out, "Boss, will you please explain to Joe that members of the safety staff have to be especially careful about obeying safety rules."

I looked questioningly at Joe and then at Bert. "What's this all about?" I asked.

Joe smiled and said, "Bert was just trying to give the greenhorn a hard time on his first day on the job, and when I showed him I knew it was silly, he got mad, and we came back to the office."

Bert said, "I brought him back because I didn't want the men seeing a safety man violating one safety rule after another, and because I couldn't convince him that the rules mean what they say."

I asked what the violations were, and Bert mentioned them: declining to wear his hard hat; refusal to wear goggles in the Mortenson plant; and jaywalking. Joe's response was that it was hot and they were near no overhead hazards; that he had worn goggles in the Mortenson plant when they visited the foundry; that no traffic was coming when he cut diagonally across an intersection.

I took Joe out for coffee and laid the law down to him, explaining the reason for the rule that every safety man on the project wears a hard hat all the time except inside an office.

I explained that Mortenson had a universal goggle rule, and I reviewed our pedestrian accident experience. I concluded by telling him just as emphatically as I could that neither Bert or Lee was trying to give him a hard time – that they were dedicated men who lived under a code of rigid personal discipline and that I expected him to live under the same code.

Joe said, "Well boss, now that you've explained it, I see the point, and I'll watch my step. Why didn't Bert put it that way?"

I snapped back, "Because Bert assumed you were a sensible man who would do what you were told."

Despite this rebuke Joe didn't feel called on to apologize to Bert.

Wednesday Joe went inspecting with Lee, and there were no particular incidents. "At least," Lee reported, "he didn't make the same boner twice."

Thursday we had a complaint from a union grievance committee which the management of Martin and Martin asked us to check on. It

"We're in the office now, Joe . . . you can forget about safety."

Case History No. 105

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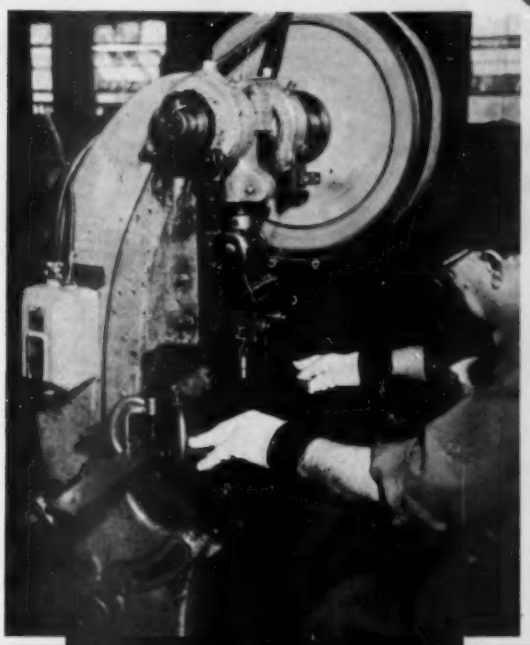

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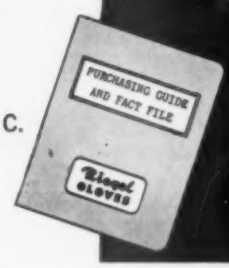

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CIRCLE 30 ON READER CARD

dealt with a charge that toxic fumes were being released and making the men sick. Joe asked if he could check it out.

"I did some special research in this field at Tech," he said, "and I know how to use air sampling equipment." So I sent him on the job, since the rest of us were overloaded.

Joe came back in a couple of hours with an alarming report. Without thinking the situation through, I called young Martin and told him he'd better shut down, and I gave him the data Joe reported to me.

Fortunately, Martin is a reasonable and well-informed man. He kept me waiting on the phone while he gave the shut-down-and-stand-by order. Then he returned to argue with me. It developed that his own staff had already checked the atmosphere and that their data was entirely different from what Joe had reported.

I knew I had talked Martin into a shut-down action that would cost him hundreds of dollars an hour, so I grabbed the equipment and tore over to the plant in a hurry. My findings agreed with the company's, and Martin and Martin went back into production. I returned to the safety office to find Joe explaining to my secretary how he had prevented a major disaster.

Cross-questioning revealed Joe was a total ignoramus about the equipment he'd used. He had, at best, used it under controlled laboratory conditions with professors showing him every step of procedure.

"Listen, Joe," I said, "and listen hard. It is no discredit to you that you are not qualified in the use of specialized equipment. But one thing I simply cannot tolerate is for you to claim to know more than you do. Do you realize that if you had made a different error, you might have been responsible for the death of men?"

"I don't see that, boss," he replied in respectful tones. "After all, I erred on the conservative side, the side of caution. Isn't that a safety man's duty?"

"You didn't know you were erring at all," I barked. "You misled me about your qualifications to handle the equipment, and the direction of error was sheer chance."

"But the place does stink," he said.

I considered several rejoinders, rejected them all, and finally sent him out to familiarize himself with the quitting-time traffic pattern around the main gate.

"When I said wear a hard hat on this job Flanagan, I meant . . ."

When I left for home at 5:45, Joe was back in the office, pecking at a typewriter. I was afraid to ask him what it was for fear I'd discover that in 45 minutes he'd acquired the knowledge to draft a report on what ought to be done about the traffic problem on the Project, and I wasn't calm enough to deal with that last night.

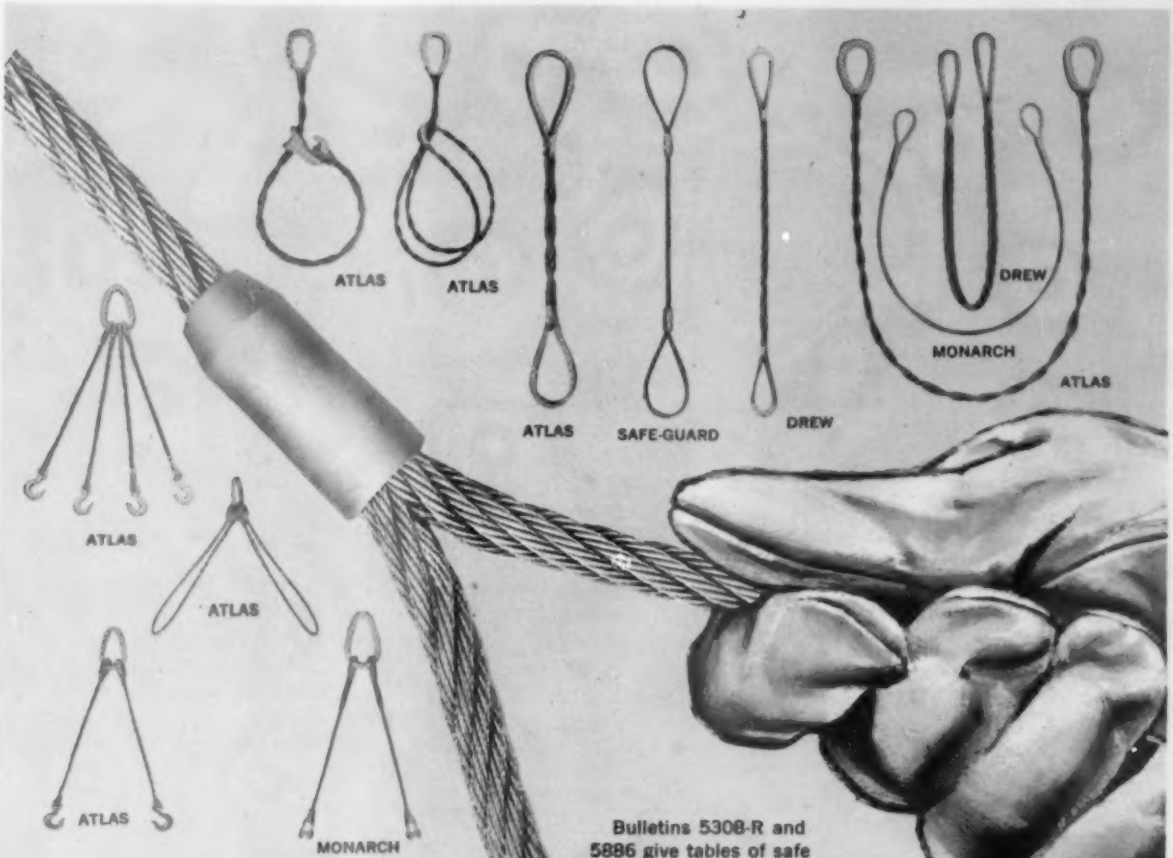
This morning there was no report, so I was encouraged. He did have a couple of verbal suggestions about the handling of the traffic, but he seemed ready to accept my explanation of why I rejected the suggestions. With some nervousness, I told Joe it was time for him to go off inspecting on his own, and I gave him a quiet beat to walk – including neither Mortenson's nor Martin and Martin.

I checked to be sure he had report blanks and remembered what the three of us had told him about the work of safety inspection. I concluded with the plea, "Joe, please, remember you're green. If you see something wrong, write it down and we'll talk about it. But, please, don't get into any hassles on the shop floor with men who know their jobs a hundred times better than you do."

So Joe went out and inspected, and we went over his report at lunch. It really wasn't bad, and I was pleased to have a chance to compliment him on his progress.

I suspect that compliment was a mistake! Joe left to continue his rounds with a light step, a joyous heart, and a devastatingly swelled head.

He stayed out of trouble until



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CIRCLE 31 ON READER CARD

CIRCLE 32 ON READER CARD

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CIRCLE 33 ON READER CARD

3:30, but then some perverse fate led him into Bart Kelly's heavy machine shop at the tractor plant just as a crane brought in a lot of bar stock and deposited it at right angles across the main aisle.

In the process, a chain failed and the stack slewed askew, and Bart walked into the confusion to do what had to be done – to do it quickly, firmly, and only a little profanely. This was the moment Joe decided to lecture Bart on the unsafe handling of material.

You have to know Bart Kelly to appreciate the situation. He is an old-line production man *and* a safety fanatic. Heading a department of a type not noted for good safety records or immaculate housekeeping, Bart has built up a safety and housekeeping program that would stand up with any department in any industry. He is vice chairman of the project-wide safety committee, and a loyal ally of mine. In his own shop he is a genial, protective tyrant. Also he is all man.

I would love to have heard him tell Joe off – but I wish with all my heart he had never had the need to do so.

All I've heard about the details is Bart's "Keep that jerk outa my shop," and Joe's written comment on the incident: "The supervisor is a typical ignorant, unprogressive man who rejects all efforts on my part to offer constructive suggestions."

I don't suppose even yet Joe believes me when I try to explain to him that when a craneload of material enters Bart's shop, there isn't a man anywhere in the shop who could be struck if the whole load came crashing down. Bart has drilled his men like the old top-kick he used to be, and his men jump when he gives orders.

Well, the week is over, and Joe can't get into any trouble until Monday – I hope.

And I can spend some time thinking through the question of whether this most unpromising of all assistant safety engineers is redeemable.

Fools' Golden Rule

CIVILIZATION has corroded the golden rule. "Do unto others as they do unto you," is now the party line.

If a guy cuts you off, relax. By cool maneuvering you can cut that ?*=! off at the next light.

If the boss is a stickler for being on time, let him stickle. Just goof-off double time when he's not around.

If company rules give you a boxed-in feeling, don't develop a complex. Any dumb bunny can manage to break a few regulations by proper scheming.

If the job is mapped out step by step, don't get bored by following that same old routine over and over. There wasn't a procedure developed that couldn't be improved on by short-cutting.

If you have to work with a joker you can't stand, don't lose sleep over it. Fix his cork by fouling something up and getting him blamed.

If the tools don't suit you, don't be a troublemaker and complain. Louse up a few pieces, and the boss'll get the message.

If you're gonna be laid off or put on part-time, don't make an ulcer. Strain your back and loaf on workmen's compensation till things ease up.

If a job is gonna be heavy or dirty, don't waste your talent on it. See that a new guy gets it.

If the pace is faster than you approve of, don't get in a sweat. Use the wrong procedures, materials or tools and slow it down.

If retirement benefits aren't enough to support you with class in your old age, don't get geriatric about it. Follow the rules listed above and you'll get knocked off before that time and won't have to worry.

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World Record

– From page 25

compensation payments show another view of this remarkable improvement. Using 1951 as a base year and assuming the 1951 compensation rate was being paid on the current payroll, Naugatuck finds it has saved from $35,000 to $50,000 annually during the past four years.

But what lies behind the statistical proof that Naugatuck has become one of the country's safest plants?

Shedd is emphatic on this point. "The essential part of our program is the monthly factory manager's meeting. Instead of working within the framework of a safety committee, a large portion of the manager's meeting is devoted to safety.

"It's because we work within this framework," Shedd says, "that Naugatuck's management is so soundly on safety's side.

"At these sessions I can talk safety to the factory manager's staff, and he's right there to back me up. There are about 20 key people at these meetings, including managers of every plant function."

Such a valuable opportunity to impress safety on those who can do something about it has not been neglected.

Shedd tells this anecdote to indicate the kind of talking he does at the meetings:

"Once when I'd been on vacation and hadn't time to work up my usual propaganda message, I just prepared the factual report of our past month's progress on fire and injury prevention. I presented the report to the industrial relations manager for review, as I do each month. After reading it he said, 'What, no pearls of wisdom?' I realized that he and the others probably were aware I'd been conducting an educational campaign in these meetings.

"Usually, the factory manager will supplement or emphasize my presentation. Often a free discussion will develop new programs to achieve our common safety objectives."

With this kind of backing and direct contact with plant-wide management, Shedd finds he gets increasingly closer cooperation on safety matters from such important departments as engineering and purchasing.

But his message doesn't stop there. Each staff member has a meeting with his people, and minutes of the meetings are sent to key men throughout the plant. Supervisors get the safety message to the shop floor in their contact with operators and workers.

"We find the safety message *does* end up with the employee the way it started," Shedd insists, "because the people in the communications chain are now experienced enough in safety to know how to use the material.

"Another phase of our program I consider exceptionally important is getting the employees enthused about safety," Shedd says. He got a solid start in this direction in 1953, the year of his first big annual campaign. Everything he and his staff could think of was done to catch workers' attention to make them aware of safety. Part of this campaign was a "brainstorm contest" – really a suggestion contest.

Shedd and his staff conducted a different promotion each month based on ideas submitted by winners of the suggestion contest.

A poster contest involved workers and their families in trying to devise eye-catching ways to publicize safety.

Particularly successful was a limerick contest. Employees were asked to write not the last line, but the whole limerick. "We were told we were crazy," Shedd says, "but the quality of the limericks were terrific."

One he remembers went:

Little Mary the outsole presser
Was quite an active aggresser.
She gave safety no heed,
Thought only of speed,
So now she is three fingers lesser.

First-prize winner ran:

A man who had reached 93,
When asked what his secret might be,
Said: "He who stops, heeds, and glances,
And never takes chances,
Will live to be older than me."

To help workers put together limericks, displays in the plant showed where to find rhyming techniques and words in the dic-

Now! Ice-Pak any injury in just 2 seconds!

Remarkable new discovery! ***NEW KWIK-KOLD INSTANT ICE-PAK. Gives instant cold that lasts up to ½ hour! For sprains, swelling, bruises and minor bleeding. Helps minimize injury, speed recovery.***

Doctors know that prompt application of cold is one of the most important first aid treatments for injury. And *how fast* cold is applied can often make the difference between days, and even weeks, of recuperation.

Now a new scientific discovery called KWIK-KOLD makes it possible for anyone—anywhere—to get the medical benefits of cold in a hurry!

New KWIK-KOLD Instant Ice-Pak gives you *instant cold* for any injury. Relieves pain on the spot—reduces swelling and minor bleeding. Much faster and handier to use than old-fashioned ice bags and, unlike ice, is always available, is not messy, is easy to carry on trips.

Quick and easy to apply. Just squeeze the plastic bag and—in just 2 seconds—you get instant cold that *stays cold* up to half an hour! The tough yet flexible plastic bag conforms readily to body contours. Non-toxic and safe, even if the bag is punctured. Keeps for extended periods of time.

Kwik-Kold provides ready relief for athletic injuries. Used by the 1960 U.S. Olympic Team, Kwik-Kold should be standard equipment for all football, basketball, and baseball teams as well as other athletic groups. For all sports injuries—sprains, black eyes, cuts and bruises—Kwik-Kold is handy and effective, indoors, outdoors, in all seasons.

New KWIK-KOLD belongs in the first aid kit of everyone who has to deal with sudden injuries. Get Kwik-Kold from your local first aid equipment supplier or write International Latex Corporation, 350 Fifth Avenue, New York 1, N. Y.

Kwik-Kold can be stored at any temperature, always ready for immediate use. Tough yet flexible plastic bag contains dry Cold-Crystals and an inner pouch of special fluid. When you squeeze bag, fluid is released to activate crystals and give *instant cold*. Apply as you would an ice pack. Bag measures 6" x 9", conforms smoothly to body contours, is not lumpy, messy, or drippy. Dispose of bag after use.

How Cold Works in the Treatment of Injuries:

Cold is medically recognized for its value in the treatment of various injuries. In *minor bleeding,* cold has an astringent action on tissues and constricts capillaries, thus acts to reduce blood flow at the site of the wound. By reducing effusion of blood to wound, cold helps reduce *swelling, inflammation, and discoloration* in bruises and sprains. The local anesthetic effect of cold helps *relieve pain.* And because it restricts blood flow to and from the wound, cold slows spread of venom in treating *insect and snake bites.*

How To Use Cold in Emergency First Aid:

Sprains. Elevate injured part to a comfortable position. *Apply cold packs* to sprain to ease swelling and relieve pain.

Bruises, Black Eyes. Apply cold pack promptly to bruise for 20 to 25 minutes. Cold inhibits flow of blood to wound, helps limit discoloration, reduce swelling and pain.

Bleeding. In bleeding from the nose, the head should be kept erect, as lowering the head tends to encourage continued flow of blood. *Apply cold* to the nose, and if the bleeding is from near the tip of nose, pinch the nostrils together for a few minutes. In bleeding from cuts and abrasions, keep the area raised and *apply cold* in conjunction with other prescribed treatment.

Insect & Snake Bite: *For bee, wasp and hornet stings,* remove stinger with sterilized needle or knife point. *Apply cold* to sting to relieve pain and slow absorption of venom. Apply calamine lotion to relieve itching. *For ant, chigger and mosquito bites,* wash affected parts with soap and water, then apply paste of baking soda. *Apply cold* to reduce swelling. *For snake bite,* follow prescribed first aid procedure, *using cold* application on wound to relieve pain and help limit spread of venom.

Sunstroke. For mild sunstroke (marked by headache, fatigue, dizziness and, perhaps, fainting), cool patient off quickly. *Apply cold packs* to head to help lower body temperature.

Minor Burns. Follow recommended first aid procedures to exclude air from burned area and prevent contamination. *Apply cold packs* to relieve pain.

Other Uses. Cold packs may be considered for use in conjunction with other appropriate first aid measures in treating minor head injuries, suspected appendicitis, headache and fever, toothache, and fainting.

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CIRCLE 38 ON READER CARD

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CIRCLE 39 ON READER CARD

tionary, giving sample limericks with good and bad meter.

To publicize the contest, a Chinese chemist at the plant lettered in his native script the phrase "no limerick – no prize." The meaning of the characters was revealed only after workers were thoroughly puzzled.

At the year's end, these and other promotions had worked interest in safety to such a high pitch that disabling injuries dropped from 23 in 1953 to 7 in 1954.

Another year, accident investigation was highlighted. Staff men, plant engineers, the production supervisor, and the industrial relations manager went right out where accidents had happened. This impressed the operators with the idea that top management thought safety was important enough to merit personal attention.

Even where injuries were mainly the fault of the operator, physical changes were made to show the sincerity of management's safety preaching.

Setting sights on a different area each year has gradually stimulated plant-wide safety consciousness. Once interest is created in a particular facet of safety, Shedd discovered, it tends to be self-maintaining, with a gentle push now and then.

Although Shedd is often the motivating force, many of the ideas and most of the details are the work of his assistants, Frank Ficco, safety inspector, and Ray Gardner, plant protection supervisor.

To put his programs across to employees, Ficco frequently devises original posters. "We often need to get a specific message to the people in a department quickly," Shedd says.

So Ficco speedily letters with a paste-up type kit, clips illustrations from wherever he finds them, and has the pasted-up poster reproduced and enlarged on plant photostat and blueprint equipment. Needed color on the finished product might be put on with crayons by a gate guard.

These and NSC posters are rotated throughout the plant. A packet of five or six will keep all the boards alive for a month, with a different poster on each board every week.

In keeping with attempts to get *everyone* safety minded, Gardner has his watchmen make daily reports of hazards they spot on their rounds. These reports are consolidated into memos to the section responsible for the hazards and must be answered with a report of corrective measures taken. He finds the system aids in housekeeping, as well as converting the watchman's role from after-the-fact discovery to before-the-fact prevention.

Shedd has several irons in the fire for future campaigns against accidents. He plans to put the safety section's plans in the form of standards to assist purchasing and engineering departments. (He currently relies mainly on personal contact to keep other departments aware of specific requirements.)

He also has in mind simple diagrams to illustrate for supervisors the basics of guarding pinch points and other dangers. His aim is to make them safety experts in their particular area, capable of recognizing unsafe acts and hazards and interested enough to take steps to correct them.

Is lack of physical hazards a reason for the records established at the Naugatuck plant? "Not at all," says Shedd, "we have 4,400 men and women producing canvas and rubber footwear. Operations include die cutting, heat molding, rubber kneading, milling, and sewing operations. There are all kinds of hazards that have developed over the years.

"Workers on certain presses actually hand-hold dies under the press head for thousands of cuts a day. A machine shop, which manufactures much of the plant's specialized machinery, presents all the opportunities for mishaps present in metal working operations."

Safety devices are built into or added to new equipment following the simple but effective standard: keep the operator out of the point of operation. This is extended to older machines when there is occasion to modify or rebuild them.

Pending the utopian hazard-free plant, Shedd's practical safety philosophy seems to be an effective one: get management, staff, supervisors, and workers so interested in accident prevention that they take intelligent safety action on their own initiative.

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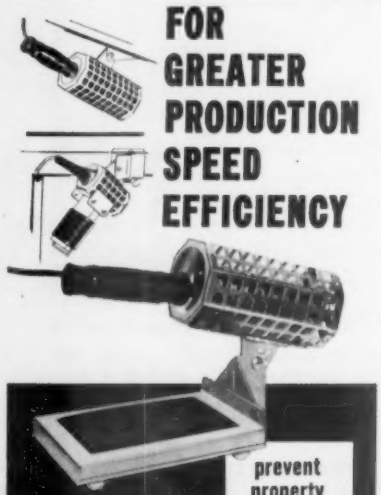

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Around The Compass

By JAMES M. BASHAM
Field Service Department, NSC

Kentucky Council Publicizes Fatalities

The Louisville Safety Council each month sends out a fatality report. It goes to all members of the council, clergymen, radio stations, newspapers, clubs, organizations, and interested individuals in Louisville and Jefferson County.

It shows fatalities in Louisville and in Jefferson County on a cumulative basis from the beginning of the year compared with the previous year. Fatalities are broken down by types – occupational, motor vehicle, public, and home.

Printed on the form is a cost factor per fatality for different types of accidents—motor vehicle, $165,000 per fatality; home, $46,000 per fatality, and other costs.

WCS Lists Safety Speakers

The Wisconsin Council of Safety recently printed the fifth edition of *Who's Who in Safety*, a listing of safety speakers compiled as part of the WCS public relations program to help local safety councils, service clubs, and other groups promote safety.

Both Wisconsin and out-of-state speakers are listed, with address and telephone number, what subject (or subjects) he speaks on, and whether he charges fees or expenses.

Copies are available from R. W. Gillette, executive director, 119 E. Washington Ave., Madison 3, Wis.

Hire Industrial Safety Man

Edmund Law, 44, recently joined the Maricopa (Ariz.) Safety Council as industrial safety engineer. He formerly was with the Cadillac Motor Car Div., General Motors, Cleveland, as safety administrator.

Law's chief responsibility will be to organize and develop an accident prevention program for contractor members of Associated General Contractors, Arizona chapter.

Coming Events

Aug. 13-17, Detroit
1961 Meeting of American Trucking Associations' Council of Safety Supervisors (Hotel Fort Shelby). Bernard Goodrich, A.T.A., 1424 16th St. N.W., Washington 6, D.C.

Aug. 31-Sept. 1, Poland Spring, Me.
Thirty-fourth Annual Maine State Safety Conference (Poland Spring House). Arthur F. Minchin, secretary, Department of Labor and Industry, State House, Augusta, Maine.

Sept. 21-22, Baltimore, Md.
Governor's Annual Safety-Health Conference and Exhibit (Hotel Emerson). Joseph A. Haller, executive chairman, Dept. of Labor and Industry, State of Maryland, 301 W. Preston St., Baltimore 1, Md.

Sept. 21-22, Salt Lake City, Utah
Annual Fall Convention of the Utah Industrial Safety Society (Prudential Federal Building). E. B. Robbins Jr., president, P.O. Box 1722, Salt Lake City, Utah.

Sept. 25-26, Manhattan, Kan.
Twelfth Governor's Industrial Safety Conference for Kansas (Kansas State University). Harold L. Smith, commissioner of labor, Kansas Dept. of Labor, 401 Topeka Blvd., Topeka, Kan.

Sept. 25-28, New York City
1961 Industrial Building Exposition (New York Coliseum). Ed Grief, Banner and Grief, 369 Lexington Ave., New York 17.

Sept. 26-27, Harrisburg, Pa.
Annual Occupational Safety Conference, Pennsylvania Department of Labor and Industry. Frank K. Boal, deputy secretary, Dept. of Labor and Industry, Harrisburg.

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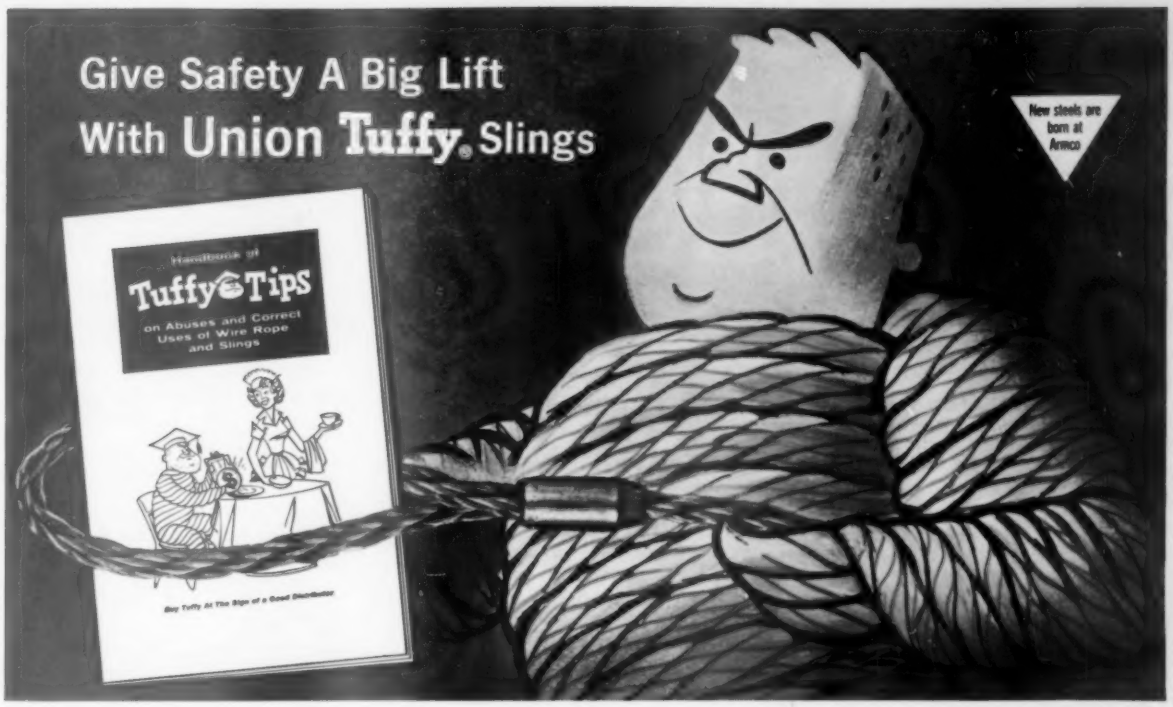
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The many Tuffy Tips in the book, on the proper use of slings and hoist lines, will prove almost as helpful in providing longer service as has the patented 9-part machine-braided wire fabric construction of Tuffy slings. Send for this book—no charge to sling users. See how Tuffy-Tips, Tuffy Slings and Tuffy Hoist lines work in hand-and-glove harmony to cut hoisting costs and down time in every kind of materials handling.

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4. Uni-Grip wire rope sling with return loop splice and pressed-on metal ferrule.

Union Wire Rope Tuffy Tips on safe use of Slings and Hoists

Safety Council Cites Factors In Lifting Injuries:

The National Safety Council points out that nearly a fourth of all compensation cases are the result of unsafe handling, cautions against:

"(a) Handling loads that are too heavy; (b) lifting or lowering with back instead of leg muscles; (c) handling load with an insecure grip and failing to watch where hands are placed; (d) handling without sufficient help or failing to use mechanical equipment; (e) handling before getting a firm footing; (f) lifting or lowering with a jerking, twisting movement, or when the body is in an awkward position."

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1. "Tuffy Tips." Many more safety hints. Tells how to get longer service from slings and wire rope. Chock-full of do's and don't's to save money.
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ARMCO Union Wire Rope

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CIRCLE 45 ON READER CARD

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Key Contacts

NSC members listed here have designated these key contacts for handling relations between their organizations and the NSC.

Aetna Portland Cement Co., P. O. Box 392, Bay City, Mich.—J. Calvin.

American Insurance Group, Engineering Div., 15 Washington St., Newark 1, N. J.—A. D. Mullendore.

Artrolier Corp., 141 Lanza Ave., Garfield, N. J.—J. E. Gajarsky.

Atlantic Research Corp., Shirley Highway at Edsall Rd., Alexandria, Va.—H. T. Scott.

Beacon Construction Co., 102 Hano St., Boston 34, Mass.—Charles E. Hill.

BJ Service, Inc., 6505 Paramount Blvd., Long Beach 5, Calif.—C. L. Sorrentino.

Buckingham Mfg. Co., Inc., 79 Travis Ave., Binghamton, N.Y.—Harry E. Hoover.

Cincinnati Milling Machine Co., 3701 Marburg Ave., Cincinnati 9, Ohio—N. E. McDermott.

City of Fort Lauderdale Municipality, P. O. Box 1181, Fort Lauderdale, Fla.—R. J. Zissette.

City of Port Arthur, Port Arthur, Ont., Canada—D. H. Annala.

City of Rock Island, City Hall, Rock Island, Ill.—John E. Kerrigan.

Corhart Refractories Co., 1600 W. Lee St., Louisville 10, Ky.—Ralph Pettit.

Grade Foundries Inc., Liberty Div., Milwaukee 1, Wis.—Joseph Mason.

Hess, Inc., State St., Perth Amboy, N. J.—Howard Wyatt.

Kansas City Southern Railway, Louisiana & Arkansas Railway Co., 4601 Blancard Rd., Shreveport, La.—D. K. Owen.

Lone Star Gas Co., 301 S. Harwood St., Dallas 1, Tex.—W. A. Allred.

McKiernan Terry Corp., 100 Richards Ave., Dover, N. J.—Frank R. Boyd.

Meadow Valley Lumber Co., Route 1, Quincy, Calif.—Philip S. Miller.

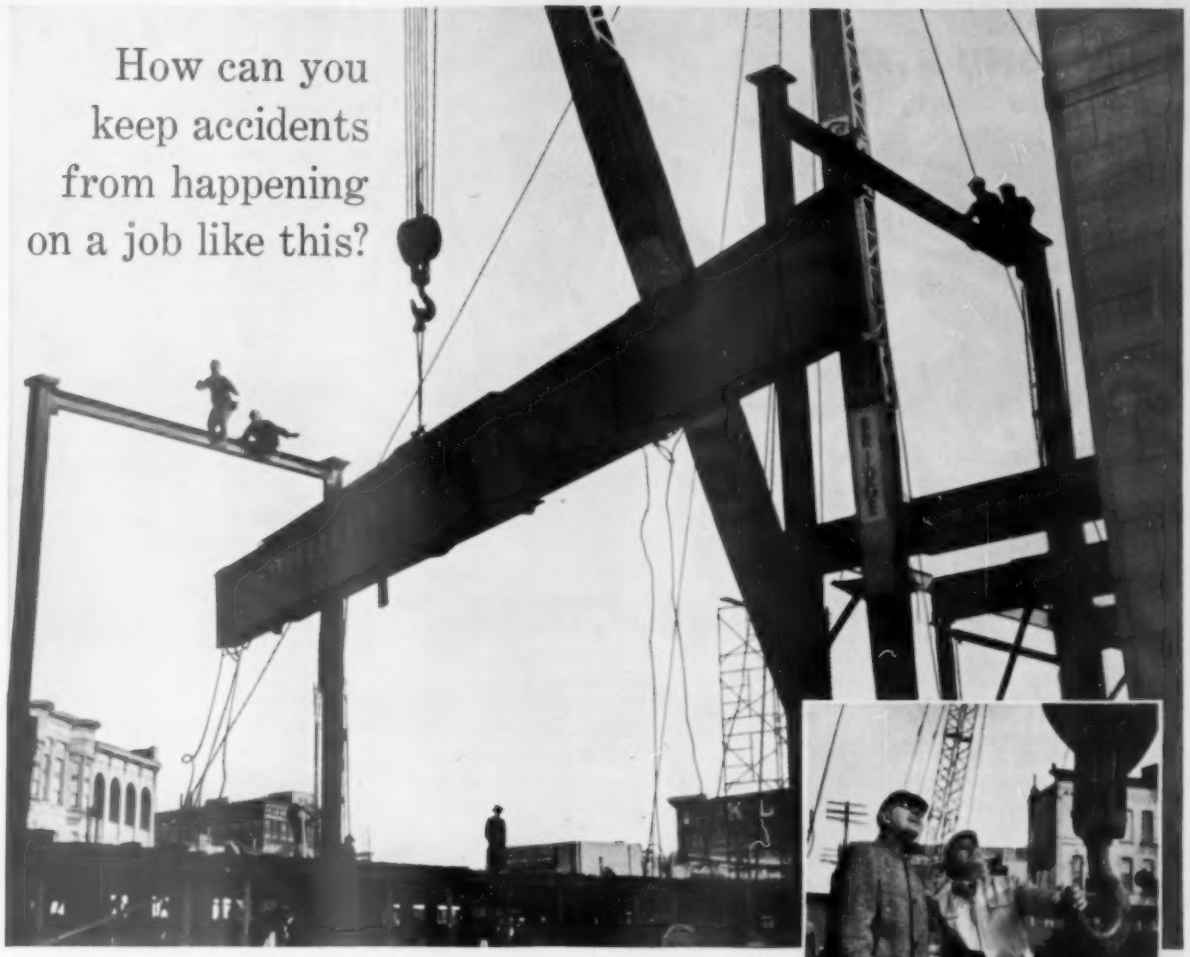
Milwaukee Gas Light Co., 626 E. Wisconsin Ave., Milwaukee 7, Wis.—Norman J. Hundt.

Newfoundland Fluorspar Ltd., St. Lawrence, Newfoundland—E. N. Nelson.

New York City Transit Authority, 370 Jay St., Brooklyn 1, N.Y.—Raymond Davis.

Orr and Sembower, Inc., Morgantown Rd., Reading, Pa.—C. T. Stick.

Page Airways, Inc., Atchison, Kan.—H. H. Wright.



Wausau Story

by **ARTHUR L. RIEMER,** *Chairman of the Board*
Wisconsin Bridge and Iron Company, Milwaukee, Wisconsin

"Steel girders 60 feet long and weighing 29 tons apiece are hoisted 4 floors high by a guy derrick. Up there our men are perched on the top of columns. They guide the girder into place and swiftly rivet it.

"That's typical of our work in erecting the steel framework for the new addition to the Milwaukee Journal Building. Remember too that many men are working close by...our own men as well as those employed by the other contractors on this job.

"Can you prevent accidents here?

"We do. And I give a great deal of credit to our insurance carrier, Employers Mutuals of Wausau.

"Employers Mutuals has a service structure strong as steel itself. Their safety experts analyze the job before we start it to find where and how accidents can happen. Then they help us set up the necessary safety precautions.

"Our company is not alone in realizing the importance of dealing with the right insurance carrier. Five Employers Mutuals' policyholders, including the Milwaukee Journal itself, are involved in this one job."

Mr. Riemer's son, Arthur (left), is president of Wisconsin Bridge and Iron. He shares his father's concern for the safety of their 400 employees. Ed Baxa, Employers Mutuals Safety Engineer, visits the job often.

★ ★ ★

Employers Mutuals of Wausau has 138 offices throughout the country to provide prompt and thorough service for policyholders. We write all forms of fire, group health and accident, and casualty insurance (including automobile). We are one of the largest and most experienced underwriters in the field of workmen's compensation. Consult your telephone directory for your nearest Employers Mutuals representative or write us in Wausau, Wisconsin.

Employers Mutuals *of* Wausau

PIONEER UNDERWRITER OF WORKMEN'S COMPENSATION INSURANCE IN AMERICA

FOR 50 YEARS
"Good people to do business with"

CIRCLE 47 ON READER CARD

CIRCLE 48 ON READER CARD

KENNEDY
HEAD SNUGGER
Winter Liners

ESSENTIAL for outdoor workmen

Kennedy Head Snuggers, as liners under safety hard hats provide the necessary protection against cold wintry blasts. Made of strong, sanforized materials, completely washable. Hold their shape and color. An outstanding buy in winter liners.

Tops in Warmth
Comfort and Safety!

The Original and Only "Head Snugger"
SPECIAL MODELS for LINEMEN
with Molded nylon KLIKON buttons
—no metal parts.
Write for complete information

KENNEDY-INGALLS, Inc.
3735 NORTH 35TH STREET
MILWAUKEE 16, WISCONSIN

MORSE
Model 80 *Barrel-Lift*

Now . . . one man can safely handle liquid drum loads from 500 to 1,000 lbs.—raise, rotate, transport, tilt and drain 55 gal. drums. The mess, expense and hazards of spills, leaks, overflow and drum damage are eliminated. Sturdy, all steel welded construction . . . rubber tired wheels with ball bearings and rubber tired rear caster.

MAN • MINUTE • MONEY SAVERS!

MORSE Model 85
Drum-Karrier

Provides complete control. Easy one-man operation. Attaches to any monorail hoist . . . for all double chine drums 23" in diameter, 36" in height. Positive tilt locks hold drum in vertical position for carrying . . . provide control of tilt for mixing or dispensing. All steel welded construction.

Clip this ad to your letterhead

MORSE
MANUFACTURING CO., INC.
765 West Manlius Street, East Syracuse, N. Y.

CIRCLE 49 ON READER CARD

George Nickel

New Industrial Council Names President

GEORGE NICKEL, safety manager, Armstrong Cork Co., Lancaster, Pa., has been designated president of the newly formed Industrial Safety Council of the Lancaster, Pa., Manufacturers' Association.

Forty-nine representatives of area industry attended the council's charter meeting. Outlining the council's plans, Nickel stressed the need for off-the-job as well as on-the-job safety programs.

Frederick H. Deeg

Deeg Heads Insurance Group Accident Prevention

FREDERICK H. DEEG, Wilmette, Ill., has been appointed manager of the Accident and Fire Prevention Department of the Federation of Mutual Fire Insurance Companies, the National Association of Automotive Mutual Insurance Companies, and the National Association of Mutual Casualty Companies. He succeeds JOSEPH C. STENNETT, who will continue as consultant.

PERSONALS

News of people in safety and related activities

Laboratory Creates New Safety Post

AL ZIRKES has joined Wyle Laboratories in the new position of staff engineer for safety.

Zirkes was formerly with Marquardt Corp., Van Nuys, Calif., as health physicist in charge of radiation and toxic materials safety. Previously, he was with Curtiss-Wright Corp. and Westinghouse Electric Corp. in their atomic energy programs.

He will be in charge of the firm's safety program at all the company's divisions. He has a B.S. degree from City College of New York and has taken graduate courses in occupational and radiological health.

ASSE Honors Eight Members

The American Society of Safety Engineers has established the title of *fellow* to honor members for outstanding safety contributions.

Eight members have been selected for this title. They are:

Robert H. Albisser, safety manager, Merck & Co., Rahway, N.J.

Fred H. Braun, vice president, accident prevention, Employers Mutuals of Wausau, Wausau, Wis.

John A. Dickinson, safety consultant and former chief of the Code and Specifications Section, National Bureau of Standards, Washington, D.C.

Herbert W. Heinrich, chairman, Uniform Boiler and Pressure Vessels Society, New York, N.Y.

Arthur J. Naquin, safety counselor, New Orleans Public Service Co., New Orleans, La.

Clyde C. Ruddick, manager, safety and plant protection, Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Samuel E. Sharp, director, Safety Engineering Dept., Tennessee Copper Co. Div., Tennessee Corp., Copperhill, Tenn.

Joseph C. Stennett, manager, accident and fire prevention, National Association of Mutual Casualty Companies, Chicago.

2 IN. COMPRESS
TELFA® PAD
STERILE
Distributed by
Medical Supply Co., Rockford, Ill.
IF THE SEAL OR ENVELOPE IS BROKEN STERILITY CAN NOT BE GUARANTEED.
MEDICATED OINTM
APPROX. 1.9 OZ. AV
Those who do not wish to come in contact with the person may hold a cloth over the victim's mouth or nose and breathe through it. The cloth does not greatly affect the exchange of air.
7.05 Mouth-to-Mouth (Rescue Breathing) Technique for Infants and Small Children
If foreign matter is visible in the mouth, clean it out quickly as described previously.
(a) Place the child on his back and use the fingers of both hands to lift the lower jaw from beneath and behind, so that it juts out (Fig. 12).
(b) Place your mouth over the child's mouth AND nose (Fig. 13), making a relatively leakproof seal. Breathe into the child, using about 2/3 of air in order to prevent damage to the child's lungs. The breathing rate should be about 20 per minute. Keep your eye on the chest wall.
Fig. 12
Fig. 13

Every Bell System First Aid Kit includes one

That's right—a thoughtful, safety-minded employee.

Not only are thousands of Bell Telephone people trained in first aid, but every employee is encouraged to practice safety at all times.

This is the best way we know of to keep our first aid kits from being used. And to keep our safety record the best among all types of industries reporting data to the National Safety Council.

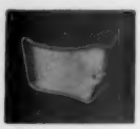
BELL TELEPHONE SYSTEM

BUY the BEST

It's the entirely new
FIBRE-METAL
"QUALITY LINER"
LINE

for WINTER WARMTH & COMFORT

Warmth, durability, comfort and convenience are built into Fibre-Metal's completely new *quality* line of winter liners... for greater worker safety and "work ability." Designed for all safety hats and caps in the field, these winter liners are made of high quality, water-repellent, mercerized and sanforized fabrics... expertly tailored for maximum service life. *Ask your welding and safety supply distributor* NOW for our more descriptive bulletin or just order by model number and size.



Model MF Mouthpiece for Models FLF, FLF-I and FLF-Z for use where face protection against cold and wind are necessary. Snap on! Same high quality fabrics.

Model FLK (Universal size). 100% Navy Blue wool. Fits all heads. May be used separately or with other winter liners for greatest warmth and comfort.

Model HLP (Universal size). Features rayon screen laminated within two layers of wet strength paper. Cotton edge binding. Form fitting, highly absorbent, costs very little. For perspiration absorption and for use as a sanitary "visitor's" liner.

Model FLF (Small and large sizes). For cold to frigid climates. Heavy gray outer flannel, red knit lining. Long neck for extra wind protection. Chin strap with adjustable snap. Provision for snap-on MF Mouthpiece to give additional face protection!

Model FLF-I (Large size only). Same as FLF but includes an extra urethane inner lining for maximum warmth in ultra-frigid climates. Provision for MF Mouthpiece.

Model FLF-Z (Small and large sizes). Same as FLF but features zipper detachment of ear flap and neck section. For mild to frigid climates. Chin strap with adjustable snap. Provision for MF Mouthpiece.

Model FLF-E (Small, Large and Extra-Large sizes). For use with all types of electrical safety hats and caps. Same as FLF but NO METAL PARTS! Long neck for extra wind protection.

Model FLN-E (Small and Large sizes). Has yellow Neoprene-coated outer fabric for exceptional warmth retention and resistance to all wind and weather (sleet, snow, rain!) conditions. Extra long neck. NO METAL PARTS makes it ideal for use with electrical safety hats and caps.

For the BEST... for Maximum warmth and comfort... ORDER NOW!

The FIBRE-METAL Products Company | CHESTER PENNA.

In CANADA: Fibre-Metal (Canada) Limited, Toronto

CIRCLE 50 ON READER CARD

Small Business And Associations

By HUGH McCAHEY

Small Business Program Director

Weapons to Combat Employee Apathy?

This article, from a recent Can Manufacturers Institute Inc. safety report, is passed along for possible use in your own safety program:

Someone once said that employees instinctively build up resistance to instructions and suggestions that come from the supervisory level. Going one step further, it was reasoned that they feel only management stands to gain and that their welfare is an incidental matter to their foreman; hence workers' indifference to safety messages.

We know you've heard it. We also know you have tried to fight and change that attitude. But because it is still prevalent, because it stands as a common conception, let's see if we can come up with other weapons to combat it.

Let's start from the beginning. As an integral part of production, safety means the same thing to all. For, however you analyze it, benefits are there to everyone when plants operate on a low accident-loss ratio. It is in the communication and translation of the positives that we may find a new tool to build safety awareness among employees. Here we'll resort to questions in hopes they will stimulate your thinking and encourage a new approach:

Do we explain benefits, disability payments, medical and other costs in a manner that suggests thinking limited to management's side only?

Is it a part of our program to point out to employees that dollars received by them for compensation are quickly gone? And do we follow up by showing that injuries received

by them may stick around a considerable length of time?

Do we let them know we have a genuine respect for their person and for their families?

Do we tell them we are going to do everything practical to make our plant a safe place in which to work? Then do we go out and do what we said we would do? And do we tell them that we did it for their safety and their protection?

Committee's Recommendations For Congress Program

Following recommendations made at the most recent meeting of NSC's Small Business and Associations Committee, the 1961 National Safety Congress program will include a step-by-step outline of procedures for setting up an association accident prevention program.

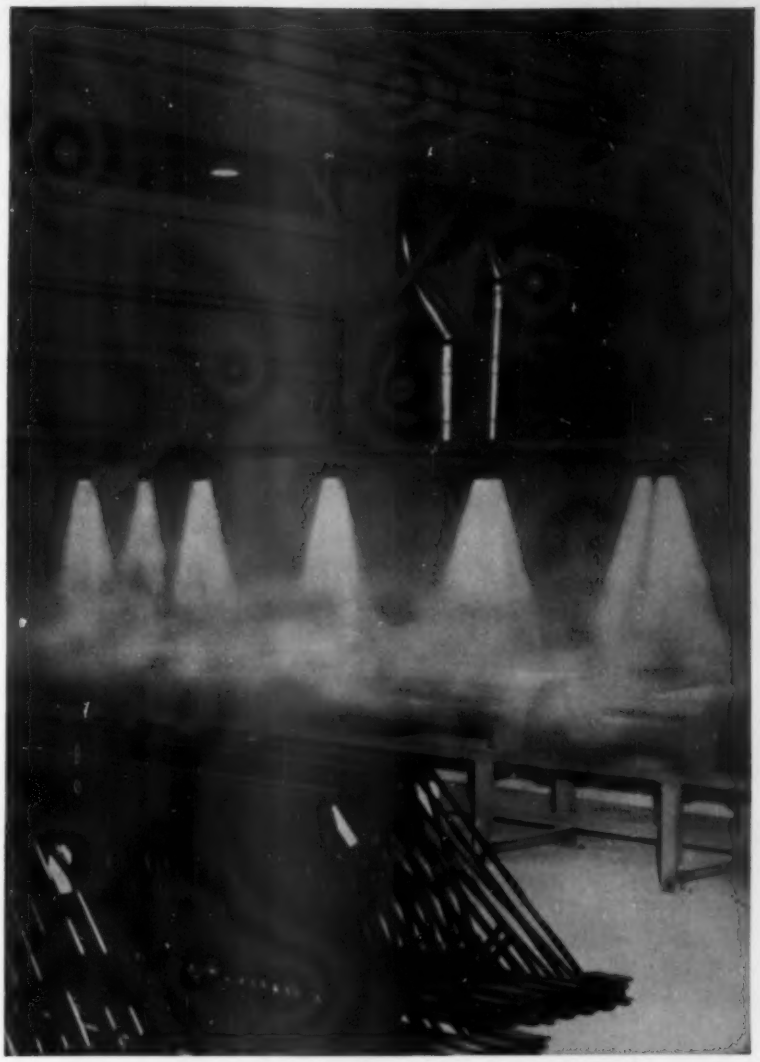
Among other committee suggestions for the 1961 Congress program were these: review of safety as an integral part of an association's activities; discussion session for exchange of ideas, questions, and problems; investigation of a pilot safety training program for association executives and further study to determine the needs of associations, particularly in the areas of materials and services provided.

Plan Now for 1962 Award Competition

Associations planning to submit entries for the 1962 Association Safety Award should begin now to make provisions for collection of necessary data from members.

Accurate records of disabling-injury frequency data should be kept, as well as notations of safety activities conducted, special safety bulletins, meetings, and promotional ideas. This will facilitate completion of the official check list of activities. Deadline for receipt of next year's entries is May 20, 1962.

Position Wanted — West Coast Safety Supervisor, Degree, 6 yrs experience. Has planned and coordinated safety and service program for agency with 1,000 employees. Will send resumé. Box 473 National Safety News.



What put out the flo-coat and drier fire?

For fires in flo-coaters, driers, quench tanks, dip tanks, storage rooms . . . nothing beats a Kidde fully automatic carbon dioxide fire extinguishing system. U.L. and F.M.-approved Kidde systems go into action at the first sign of a blaze, snuff out fire in seconds, leave no mess to clean up later. Protect yourself by protecting volatile solvents, gases, flammable liquids—*all hazards*—with an automatic Kidde system. Kidde's 40 years' experience can help you guard any fire hazard. Write today and find out how.

Kidde

Industrial and Marine Division
Walter Kidde & Company, Inc.
845 Main St., Belleville 9, N.J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto — Vancouver

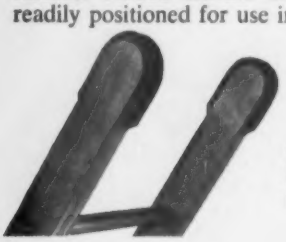
CIRCLE 51 ON READER CARD

Safe ladders . . . Save lives!

(600)

Slipping ladders cause more accidents . . . and result in more injuries . . . than any other single hazard, according to a recent survey by the Wisconsin Industrial Commission. This disgraceful fact is all the more disturbing because there is absolutely no excuse for most of these accidents. The simple inexpensive installation of Safe-Hi ladder shoes is your guarantee against accidents . . . which of course mean man hours lost, work stoppage, compensation. Ladder shoes eliminate both need and expense of second worker holding base of ladder.

Shoe tread construction of both neoprene and fibrous material gives maximum protection against ladder slipping on any industrial surface whether wet or dry, soapy, greasy or slick. Straight ridge design crosses line of slippage and acts as a series of squeegees in scraping off foreign substances thus insuring a good grip on any surface. Added feature is a self-sharpening spike which can be readily positioned for use in ice, snow or gravel.

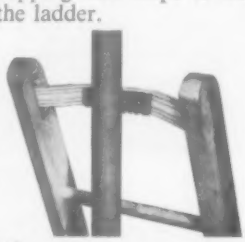


Safe-Hi Wall Grip (640)

The Safe-Hi wall grip holds the top of the ladder securely on all smooth walls. Prevents side slipping and helps to hold the bottom of the ladder.

Safe-Hi Pole Grip (632)

The Safe-Hi pole grip holds top of ladder on any pole, pipe or corner. Fits any ladder. Helps prevent ladder tipping.



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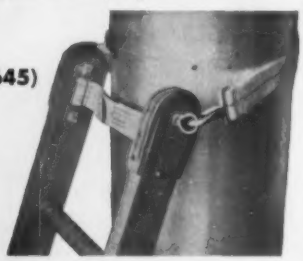

Safe-Hi Ladder Lash

The Safe-Hi ladder lash is quickly attached to any ladder. Strap made from 2800 lb. tensile strength parachute webbing with forged steel snap. Lash features quick adjustment slide that gives positive hold on pole.

Complete information on any Safe-Hi Safety equipment; write for free catalog.

Safe-Hi Safety Equipment is made by

rose manufacturing co.

RO-12

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CIRCLE 52 ON READER CARD

Consultation Corner

Answers to questions on accident prevention, fire protection, and occupational hygiene

By L. C. SMITH,

Industrial Department, NSC

Automatic Brakes for Industrial Power Trucks

Question: We have heard about industrial power truck brakes that are applied automatically when the driver leaves the seat. What information do you have on brakes of this type?

Answer: Electric-powered industrial trucks should be equipped with brakes that are automatically applied when the operator leaves the seat. This is an ASA code requirement.

Gasoline-powered trucks normally are equipped with hydraulic or mechanical brakes, operated by a hand lever or a foot pedal. To make such brakes automatic would require a solenoid or similar device to set the brakes as the operator leaves the machine. Such equipment could become complicated.

Pertinent to this problem is this quotation from the *American Standard Safety Code for Powered Industrial Trucks*, ASA B 56.1, 1959, Section 615, Safety Control and Brakes, Electric Trucks, Sit-Down Rider Type: "Brakes shall be provided that will automatically brake the truck when the operator leaves the machine."

In this same code appears this quotation, under Section 617, Safety Control and Brakes, Internal Combustion Powered Industrial Trucks, Sit-Down Rider Type: "A parking brake shall be provided to brake the truck when the operator leaves the

machine. . . . It shall be manually or spring applied through a direct mechanical system."

Gasoline-powered trucks may be purchased with automatic brakes, operated when the driver leaves the seat, as optional equipment.

Apparently the question of whether a truck should have brakes that are applied automatically depends on the type of truck – electric or gasoline. Automatic brakes could be installed on almost any type of truck. The manufacturer of the particular type of truck would be in the best position to advise you on possible braking systems.

Using Acetylene Above 15 PSIG

Question: We are using acetylene in one of our industrial operations. We have read where pressures exceeding 15 psig can be used, provided special equipment is used. Can you give us additional information?

Answer: Presumably, your operation is welding or an allied activity. Experience indicates that 15 psig is generally considered a safe limit for welding and related purposes, provided the pipe diameter is sufficiently small. With pressures above 15 psig or 30 psia, the gas is unstable and additional heat may start an explosive decomposition that will involve the whole body of the gas.

Where acetylene is to be used for chemical synthesis at pressures in excess of 15 psig or carried through large diameter pipes, special equipment and means to prevent an explosive decomposition must be used.

However, in your case it appears the 15 psig limitation applies.

WANTED: SAFETY ENGINEER
For established safety unit at University of Illinois. Must have college degree and three years' experience. Salary dependent on qualifications. Qualified candidates will be considered regardless of race or creed. Write Safety Coordinator, 605 S. Goodwin, Urbana, Ill.

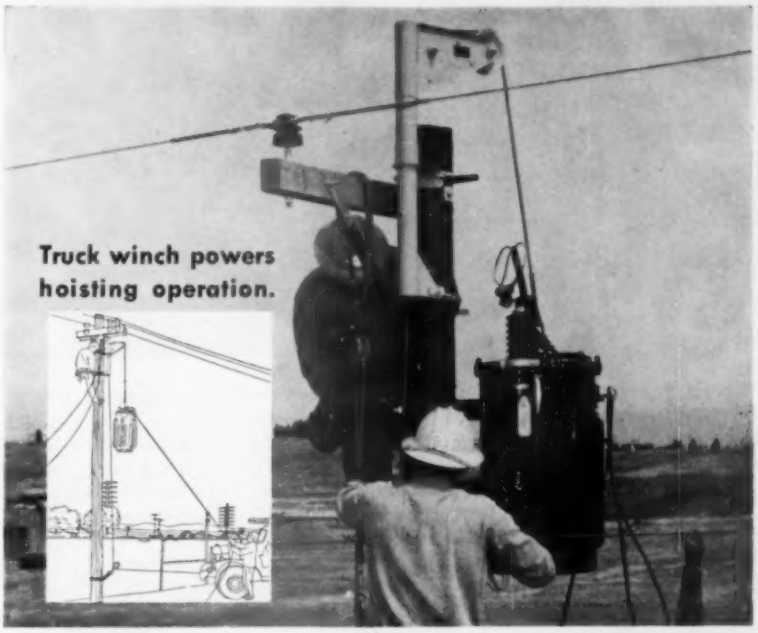
You Can Mount a MoPeCo Hoist

ABOVE

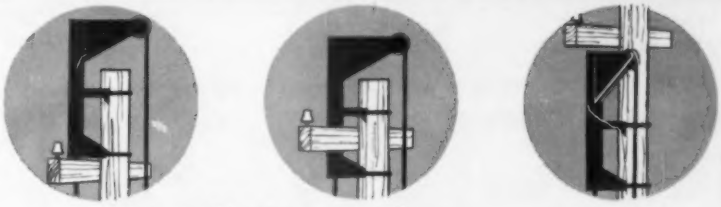
STRADDLE

BELOW

the Crossarm



Truck winch powers hoisting operation.



- One position base mounting
- 360° swivel head permits multiple installations
- Lightweight 2 piece portable unit (42 lbs.)
- Assembles easily at top of pole
- Cuts costs, provides greater safety
- Tested at 3000 lbs. lift on cable
- Uses steel cable or manila rope

Save Time, Too, with the MoPeCo Hoist. You can install 3 transformers in only 30 minutes!

Order through your favorite distributor

MoPeCo

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Write or call

MORRISON-PELSUE CO.

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CIRCLE 53 ON READER CARD

CIRCLE 54 ON READER CARD

ROCKWOOD

PocketAIRE

- COMPACT
- LIGHTWEIGHT
- FOR EVERY FIRE MAN
- EASY TO PUT ON ENROUTE TO FIRE

Three models . . . full 30 minutes . . . full 20 minutes and a full 10 minutes.

Now firemen can add precious minutes to their search for trapped victims. Rockwood's lightweight PocketAIRE, the most compact self-contained breathing apparatus made, permits firemen to put in action faster and work more efficiently without hindrance by bulky equipment. PocketAIRE is small enough to fit in pocket, clamp to fire coat or be worn in a shoulder harness.

What's more, by using pure, clean oxygen, PocketAIRE supplies the most concentrated, most effective element to safeguard human breathing. Another *extra* protection feature, on all PocketAIRE units, is the safety cylinder that allows 5 minutes for escape. Cost pennies to refill and no maintenance required.

Protect every fireman in your department with economical, safe, simple to use Rockwood PocketAIRE.

For more details, write to
ROCKWOOD SPRINKLER COMPANY
2039 Harlow St., Worcester 5, Mass.

PURE, CLEAN OXYGEN for Refilling is Available Everywhere!

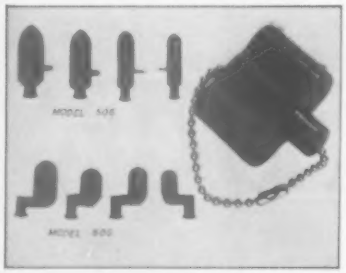
ROCKWOOD

A Division of The Gamewell Company • *A Subsidiary of* E. W. Bliss Company
Distributors in all principal cities.

Noise a Problem?

CUT DOWN NOISE WITH
S M R Earstoppers

Soft, comfortable, resilient, the SMR EAR STOPPER adjusts itself to all shapes, turns and movements of the ear canal. Models 506 and 600 available in millimeter sizes 6 through 12. Furnished in a plastic carrying case. Forty-five cents per set in gross lots.



SURGICAL MECHANICAL
SMR RESEARCH, INC.
1985 Beverly Blvd., L.A. 57, Calif.

CIRCLE 55 ON READER CARD

The Safety Library

Books, pamphlets and periodical articles of interest to safety men

By LOIS ZEARING,
Librarian, NSC

BOOKS AND PAMPHLETS

Accidents

Work Injuries in California. 1960. 35pp. Division of Labor Statistics and Research, P. O. Box 965, San Francisco, Calif.

Work Injuries Reported in Illinois, Part I of the Annual Report on Compensable Work Injuries, 1959. 44pp. List of tables A1-A48. 1961. Illinois Dept. of Labor, Div. of Statistics and Research, Springfield, Ill.

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Bird Hazards to Aircraft. John W. Aldrich and others. 1961. 10pp. U.S. Bureau of Sport Fisheries and Wildlife, Branch of Wildlife Research, Washington 25, D.C. (Wildlife Leaflet 429).

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Statistical Issue: Accident Prevention Magazine, No. 114. Portland Cement Association, 33 West Grand Ave., Chicago 90.

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Pyrophoric Hazard of Powder Metallurgy Specimens, Health and Safety Information, Issue No. 124, April 24, 1961. Safety and Fire Prevention Branch, Office of Health Education, U.S. Atomic Energy Commission, Washington 25, D.C.

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Ambulance Attendant Training; Pilot Project Report. 1960. 39pp. Appendix, Sample Forms, 14pp. Division of Environmental Safety, Dept. of Health, Pittsburgh State Office Bldg., Pittsburgh 22, Pa.

Iron and Steel Industry
Proceedings, Association of Iron and Steel Engineers, 1960. 1084pp. Association of Iron and Steel Engineers, 1010 Empire Building, Pittsburgh 22, Pa.

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Laundry Machinery and Operation. 1961. 11pp. American Standards Association, 10 East 40th St., New York 16. (ASA Z8.1-1961).

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Governors' Conference on Health Hazards in Uranium Mines: A Summary Report. 1961. 13pp. Public Health Service, Washington 25, D.C. (Public Health Service Publication No. 843).

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"Kerosene Smoke and Atmosphere Pollutants." H. Salem and H. Cullumbine. *Archives of Environmental Health.* June 1961. pp 641-647.

Blasting
"Presplit Blasting at the Niagara Power Project." Rolfs S. Paine and others. *Explosives Engineer.* May-June 1961. pp 71-78, 82-93.

Chemicals
"Bulyllelhuim. Handling and Safety Practices." Eugene W. Dezmelyk. *Industrial and Engineering Chemistry.* June 1961. pp 68A-71A.

"Knowing Capabilities of Multiwalls Helps Avoid Problems in Handling." *Agricultural Chemicals.* June 1961. pp 27-28, 30.

Construction
"Distance Creates New Safety Problems in Modern Road Building." George C. Koss. *The Constructor.* June 1961. p 44.

"Spacemen's Salvation." *Journal of American Insurance.* June 1961. pp 30-31.

"Substitute for Blasting Safe But Slower." *Better Roads.* June 1961. p 32.

CIRCLE 56 ON READER CARD

This is Haws wall-mounted Model 7300, in cast aluminum—handsomely styled to complement lab and shop; ideal for new construction.

Haws EMERGENCY Eye-Wash provides instant first aid to prevent serious injury due to eye contamination

. . . by saving those vital seconds that can mean the difference between temporary irritation and permanent injury. Controlled streams flood the eyes, washing away searing chemicals and other foreign matter. See this model and others, as well as emergency drench showers, detailed in the Haws Safety Equipment Catalog. Write today to Haws Drinking Faucet Company, 1443 Fourth Street, Berkeley 10, California.

HAWS EYE-WASH FOUNTAINS

Since 1909, designers and manufacturers of drinking fountains and water coolers

GUARD YOUR FANS NOW
Protect Workers From Injury
with the original
SAF-T-FAN-GARD

GUARDS THE FRONT — GUARDS THE REAR

Designed for factories and institutions to protect personnel from bodily injury
This fan guard prevents hand, arm and head injuries. Made of strongly woven cotton mesh fabric, with one-quarter inch openings. It is washable, mildew proof, non static, and won't interfere with the normal flow of air. Cover protects back and sides of fan as well as the front.
Immediate delivery. Write direct to manufacturer
ROCHESTER SAFETY EQUIPMENT COMPANY, INC.
83-85 HOWELL STREET ROCHESTER 7, N. Y.

CIRCLE 57 ON READER CARD

Storage Racks

— From page 29

have been built by rack makers, but were underdesigned by chance, by inadequate engineering knowledge, or to meet a low price demanded by the user.

These aren't all the reasons by a long shot. Hitting a rack with a lift truck, improper leveling on sloping floors, or insufficient bracing or anchoring of racks too high for their width can wreck a rack.

Failures also can come from dropping loads onto shelves, dislodging of a shelf beam by upward thrust, and excessive dragging of the pallet on a shelf. Inadequate welding or bolting of connections is another contributor to rack accidents. And there are many more.

Sometimes results are minor mishaps, sometimes major personal and manufacturing disasters. R. Frank Weber, consulting editor of *Modern Materials Handling*, offered five such case histories in "The Storage Rack Story." Here they are:

"In a large wholesale food warehouse, a lift truck bumped into a rack upright, bending the lower portion of the post, and the entire run of racks collapsed. The lift truck operator was injured, and a substantial amount of merchandise was damaged and lost."

"A worker was removing a steel tube from tubing piled on a rack. He pulled one tube from the center of the pile, causing the pile to slip and roll on his leg. He was disabled 102 days with a fractured leg."

"In a supply storage building, a complete section of racks failed when a shelf buckled under a loaded pallet. Several workers were injured, and a large amount of commodities was damaged and ruined."

"A lift truck operator, trying to place a loaded pallet in a very narrow opening at a high elevation on the rack, hit the post with the load and the impact caused part of the unit load to fall off the pallet, causing permanent disability to the operator as well as loss of goods."

"In a medium-sized manufacturing plant, a lightweight rack with definite storage weight limitations was used for storing heavy steel items way beyond the safe load limit. As a result, the rack collapsed, seriously injuring a plant organization man."

These accidents indicate the hazard of improperly designing racks for an intended use or overloading by inadequately trained personnel.

The problem: money, morale, production losses. The solution: finding out what your specific rack problems are (see accompanying chart titled "How to Analyze Your Storage Problems"); choosing a manufacturer whose product meets your firm's storage needs; and buying those racks.

How to select a manufacturer? Try these questions on representatives of rack makers.

1. Does the manufacturer have a reputation for building quality products? Does he stand behind them?
2. Does he design structures in accordance with accepted practices (American Institute of Steel Construction, and American Iron and Steel Institute codes)?
3. What safety factors does he recommend?
4. Can he supply safety-insuring accessories such as back bars or curtain walls to prevent goods from falling

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CIRCLE 58 ON READER CARD

off the back of the rack, or stops to prevent pallets from being put too far back when racks are back to back?

5. Are the racks easily and inexpensively assembled? Can they be erected with minimum use of tools?

6. Are the shelves adjustable or fixed? Does the design give the flexibility needed to insure optimum load dimensions and weights, and provide clearances that are adequate but not wasteful?

7. Are the racks compatible with handling equipment? Do they allow you to make use of every square foot of floor space, yet provide aisles in which handling equipment, either floor or overhead, can operate quickly, easily, and safely?

8. How much will beams deflect when loaded? How much deflection is permissible?

9. Do floor plates adequately spread the load over the floor and not cause indentations?

10. How are uprights braced? Is there diagonal or cross-bracing or is there only horizontal bracing?

11. How are the upright components assembled? If welded, are the joints lapped or butted?

12. Has cross-bracing been put at the back of the bay, between the uprights? If so, can operators push pallets against it with bending or breaking force?

13. What are the comparative weights of the several racks offered? If there is a wide variation, why?

14. Is there a wide cost differential between the racks offered by different bidders, and if so, why?

Now knowing what your storage problems are, what to look for in a rack maker's product, and having purchased high-quality racks, your company has a right to look forward to efficiency and safety.

Hat Wins Split Decision Over Falling Pulley

A chemical plant worker escaped with minor injuries recently when a 15-lb. steel wheel pulley fell 39 ft. from a scaffold post above him and struck his hard hat. The pulley hurtled down at 34 m.p.h. and split the hat on impact, but the employee wasn't hurt seriously and soon returned to the job.

These one-piece laminated plastic hats are high-pressure molded and are reinforced in cranial danger zones. The hats also are resistant to exposure from water, oil, grease, or perspiration, manufacturers maintain. Linings are replaceable and interchangeable.

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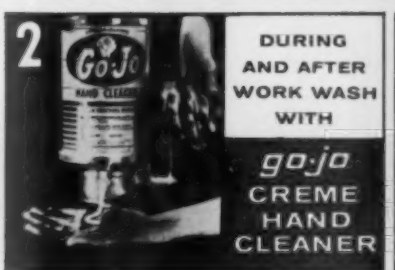

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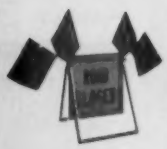

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U.S. Gypsum Co., South Gate Plant, Calif.

Westinghouse Electric Corp. (2): Buffalo Div., Buffalo, N.Y.; Meter Div., Newark, N.J.

USAF Wins 11th Straight Award of Honor

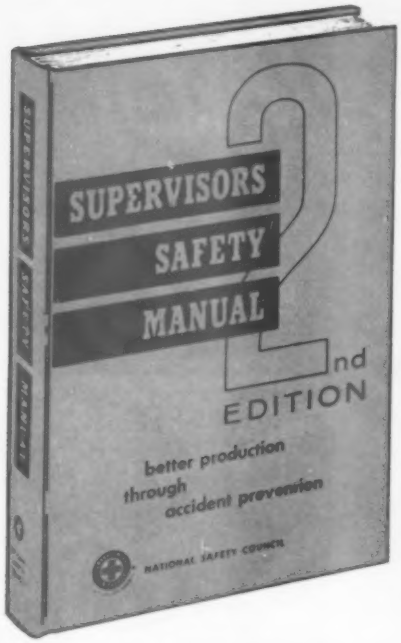
For the 11th consecutive year the U.S. Air Force has won the National Safety Council's Award of Honor. Secretary of the Air Force Eugene M. Zuckert, second from left, is shown accepting the award from NSC's Vice President, George C. Stewart. To the left is Colonel W. L. Tubbs, USAF (Ret), director of ground safety for the USAF, and on the right is Brigadier General John M. Breit, USAF deputy inspector general for security. The Air Force ground accident rate was reduced 12 per cent last year. Improvements were made in the areas of on- and off-duty military disabling injuries and fatalities, on-duty disabling injuries to Air Force civilian employees, government motor vehicle accidents and, additionally, the cost per capita on all ground accidents.

KEEPING

POSTED!

Watch this space each month for late news on NSC services. Use the handy Order Form to request sample copies of publications listed in this issue or to order safety merchandise.

August 1961



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This comprehensive 375 page text is written expressly to show foremen the relationship between safety and efficient production. It teaches basic accident prevention and human relations techniques. Instructive topics include: Know Your Accident Problems; Maintaining an Interest in Safety; Departmental Housekeeping; Fire Prevention and Control . . . and many others.

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How many of your employees would be able to give proper first aid in an emergency? The answer is probably all too few. Even for those who have received training at one time or another, it is simply hard to remember what to do in the heat of excitement.

Here is one of the most effective steps you can take to prepare your employees for that sudden emergency. The new *Pocket Guide to First Aid* is small enough to be carried permanently in a billfold or purse. When injury strikes, the facts on what to do are there at hand. Everything is stated briefly, concisely, for fast reading and immediate action. All instructions were checked with the American Medical Association.

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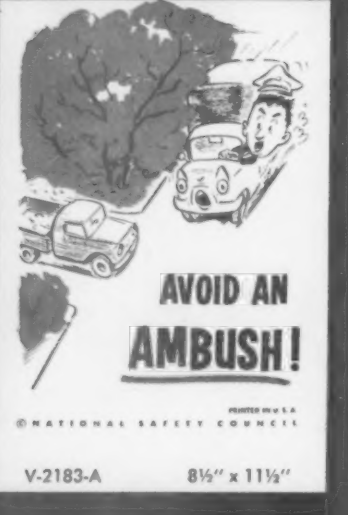

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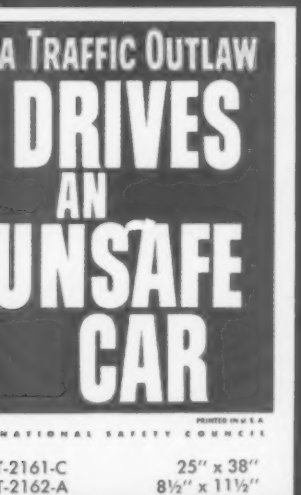

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SAFETY HINTS FOR THE ELDERLY

A series of six leaflets that discuss common physical impairments of the aged. They suggest environmental aids and personal safety tips on preventing accidents. Each leaflet is 4 pages, 3½" x 8", colorfully illustrated. Subjects: Forget Things?, A Little Shaky?, Poor Sight?, Tire Easily?, Doubtful About Driving? and Worried About Walking?

STOCK NO. 599.20—Complete set of six leaflets (cost per set): 10—$.18; 50—$.165; 500—$.138; 1,000—$.126.

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A delightful 12 page booklet, packed with dozens of practical home safety tips. Cleverly illustrated with light cartoons, there's a laugh with every lesson. The entire family will enjoy and profit from reading this booklet.

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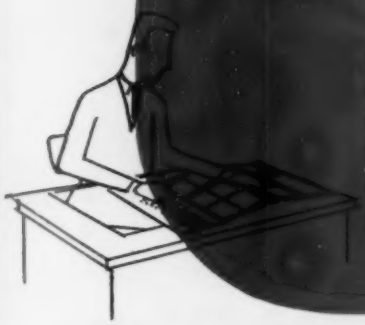

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TECHNICAL FEATURE SECTION

The Journal

OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS

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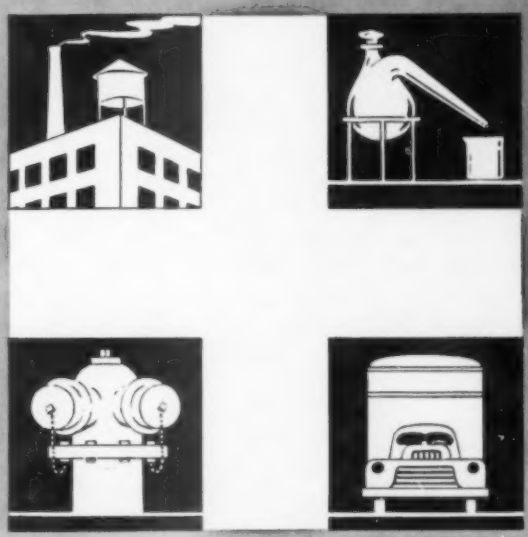

AUGUST, 1961

Journal Ends Association With National Safety News

■ THIS ISSUE OF the *Journal of the American Society of Safety Engineers* marks the end of an association with the *National Safety News* which began in February, 1956. During these past six years the Society has produced 23 issues with a total of 81 articles, in addition to the special issue (August, 1960) on "Today's Safety Engineer," a report of a study of the Society's membership made by the Special Committee on Membership Services.

In the pages of the *Journal* there have been papers by such outstanding safety and industrial figures as H. W. Heinrich, Roland P. Blake, Nobel Prize Winner Dr. Herman J. Muller, Arthur S. Johnson, Morehead Patterson, John A. Dickinson, Ewan Clague and George Romney, President of American Motors.

Noted leaders of the Society have also contributed worthwhile articles. Some of these are John V. Grimaldi, Daniel F. Hayes, C. Russell DeReamer, Robert J. Dougherty, Robert D. Gidel, Merrill C. M. Pollard, Arthur J. Naquin, the Late Robert Clair, Walter E. Montgomery, Myron L. Miller and Thomas H. Rockwell, whose second paper appears in this issue (see page 42).

These 23 issues of the Journal have set a standard representing the highest level of professionalism in the field of safety engineering. Now that we are embarking on a new venture (see Our President Speaks on Safety – next page), we hope to continue meeting this high level by providing safety engineers with the kind of information they require to perform their duties effectively – *the Editor*.

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This Journal section is the official technical publication of the American Society of Safety Engineers. It appears quarterly in the National Safety News as a service of the Society to the National Safety Council. Separately bound copies of this section for exchange purposes are provided the Society by the Council.

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Opinions expressed in articles published in the Journal are those of the authors and are not necessarily endorsed by the American Society of Safety Engineers.

OUR PRESIDENT SPEAKS ON SAFETY

IN FEBRUARY, 1956, Edward B. Landry, then president of our Society, wrote "The publication of this first issue of the Journal of the American Society of Safety Engineers is an important step in the development and growth of the Society. It is a mark of progress of which all members of the Society can be proud."

Now, almost six years later, the Society is approaching another milestone. In October we will publish our own independent Journal on a monthly basis.

The Journal has, over the past six years, fulfilled the purposes for which it was intended. Its pages have contained articles of a technical and informational nature intended to elevate the profession of safety engineering and to broaden the understanding and experience of those engaged in the practice of this profession.

During the past six years, the Society has undergone many changes. Most of these have been directed toward the one purpose of giving the Society more vitality and independence and enabling it to better serve its members.

The concept of an independent Society Journal has long been envisioned by farsighted leaders of our Society. In 1956, because of our limited resources, we accepted the offer made by the National Safety Council to publish our Journal as a quarterly supplement to the *National Safety News*. This joint venture was a further expression of the close bond which has existed between our two organizations since the years of our founding. The support and guidance of the National Safety Council has helped make it possible for us now to embark upon this new venture.

The purposes of the new Journal will be to help widen the horizon of the safety engineer and to improve his professional status. By doing this we will enhance the entire profession and make it possible for the safety engineer to make an even greater contribution toward the reduction of injury and death through accidents.

Historically, our new Journal appears as the culmination of a long line of communications efforts. Starting with a modest newsletter in the early years of our history, our publications have improved gradually to the point where we are regularly producing two periodicals and have published several individual handbooks and monographs. With increased revenue through the expansion of the new Journal, we can see the day when we may have several periodicals and many other services intended to help the safety engineer in his search for new and useful information.

With these expanded resources, we can also see a more universal understanding and acceptance of the safety engineering profession and increased recognition of the Society as a result of its greater contribution to the field of safety.

The departure of the Journal from the *National Safety News* in no way reflects upon the relationship between our Society and the National Safety Council. We will continue, as we have in the past, to cooperate with the Council in the development of technical and research materials and in other areas of activity in safety. Considering the interrelated activities of the leaders of the Society and the Council, it is inconceivable that our two organizations should not continue this fine cooperative relationship.

It has been my privilege to participate in the planning and deliberations preparatory to publishing our Journal this fall. For many months our staff has been involved with the myriad of details necessary to make the publication a reality and we are now entering the final stages. I know you share with me the hopes and pride in this new venture and I am sure you will do all you can toward making it a successful one.

George L. Gorbell

GEORGE L. GORBELL, PRESIDENT
AMERICAN SOCIETY OF SAFETY ENGINEERS

Accident Rates and *Changes* IN THE EMPLOYMENT LEVEL

by ANN STRESAU

ORGANIZATION OF DATA

Industrial injury rates expressed in "number of cases per million manhours" were available for minor cases, (first aid treatment), doctor's cases, (medical treatment required), and disabling injuries. Rates of doctor's cases and frequency rates of disabling cases for 152 months from August, 1947, to June, 1960, figured on a monthly basis were used in conjunction with a study of weekly rates for 111 weeks from January, 1958, to June, 1960.

Studies of the rates of minor cases, on the other hand, cover 87 months on the monthly basis and 49 weeks when rates could be figured on a weekly basis. It was felt that weekly rates would be more sensitive while monthly rates would reflect general trends. The balance of these two approaches enhances the reliability of the conclusions.

Rising and falling employment is based on a percentage of the average employment. For example, in the 111 weeks from January, 1958, to June, 1960, the average employment was 8,300. This, then, was considered to be an index of 100. Add 83 employes or 1% and the index will be 101. A change of 1 point in the index compared to the index of the week immediately preceding would conxistitute a rise or fall in employment for that week. No change in the index would be considered a "stable" employment. The same principle was used in studying the monthly rates.

Periods of high employment and low employment do not necessarily coincide with periods of rising and falling employment. Thus, they were analyzed separately.

To determine whether or not differences in percentages were statistically significant, an "omega" nomograph prepared by C. H. Lawske and P. C. Baker of the Occupational Research Center, Purdue University, was used. Omega is based on the number of monthly or weekly rates used in the study. By comparing the "omega achieved" as determined by the nomograph with the "omega needed" determined by a formula, one can decide whether or not a difference is significant.

"Omega achieved" is further used in determining values of "t", the standard statistical value which is used in finding the changes in 100 that a percentage difference could have occurred by chance. If a difference could have occurred by chance more than 5 times in 100, this would not be considered a significant difference in this study. In other words, the 95% confidence level is used as the basis for significance.

Significant differences in means, rather than percentages, have been determined by comparing actual differences with the standard error of the difference.

TABLE I AVERAGE RATES DURING CHANGING EMPLOYMENT

Average Rates of:	Weekly rates study: Falling Employment	Weekly rates study: Stable Employment	Weekly rates study: Rising Employment	Monthly rates study: Falling Employment	Monthly rates study: Stable Employment	Monthly rates study: Rising Employment
Minor Cases	1513 ± 120	1623 ± 222	1804 ± 268	956 ± 115	988 ± 122	992 ± 141
Doctor's Cases	55.0 ± 13.4	59.0 ± 16.8	59.2 ± 14.4	44.6 ± 11.2	46.3 ± 11.7	48.9 ± 10.2
Disabling Cases	5.7 ± 3.9	5.5 ± 4.4	5.8 ± 4.8	9.0 ± 5.5	10.2 ± 5.4	11.0 ± 5.8

Note: Rates for weekly rates are based on "shop" hours only and are therefore generally higher.
Frequency rates at the West Allis Works have fallen substantially during the 13 years of the "Monthly Rates Study." Therefore, although the weekly rates are higher than they would be if salary hours were included, the monthly rates are even higher since they cover a much longer period of time.

Analysis of above data showing how many times in 100 the difference could occur by chance

	Weekly rates study: Falling vs Stable	Weekly rates study: Rising vs Stable	Weekly rates study: Rising vs Falling	Monthly rates study: Falling vs Stable	Monthly rates study: Rising vs Stable	Monthly rates study: Rising vs Falling
Minor Cases	4*	2*	.01*	15	46	15
Doctor's Cases	12	48	13	24	15	1*
Disabling Cases	41	39	46	15	25	3*

*Less than 6 times in 100; therefore significant at the 95% confidence level

Ann Streeau, supervisor of safety education and statistics at Allis-Chalmers Manufacturing Co., Milwaukee, has been with the company in safety work for many years. Miss Streeau holds a BA degree in psychology from the University of Wisconsin and has presented several papers before safety conferences.

DO PERIODS OF increasing or decreasing employment have any significant effect on accident rates? Are accident rates more likely to be high or low during periods of high employment?

Studies have shown that inexperienced employees have higher rates than experienced men and this could affect the entire plant rate during a period of rising employment.

In addition rates could be expected to increase during periods of falling employment when considerable transferring of workers from one job to another might lead to higher accident rates.

A survey conducted by Allis-Chalmers, West Allis Works, Safety Services Section, disclosed that high and low levels of employment affected accident rates and these rates were sometimes affected during the rising and falling periods as had been suspected.

On Table I are the average rates of minor cases, doctor's cases, and disabling cases during periods of rising, falling, and stable employment. Following each average rate is a tolerance expressed in terms of the standard deviation.

ANALYSIS OF DATA

An analysis of this data shows that in the year between April, 1959, and April, 1960, the average rate of minor cases was significantly higher during periods of rising employment and significantly lower during falling employment. No significant differences were found in the longer study.

When the data was analyzed similarly for the periods from 1947 to 1954 and from 1955 to 1960, the relationship persisted. This test substantiates the reliability of the study and shows the effect of new employees on the rates during periods of rising employment. A high rate of transferring, however, did not affect the relationship in a falling employment.

DISABLING INJURIES

Disabling Cases – The relationship between changing employment and frequency rate of disabling injuries is not as marked. In the weekly study covering a year and a half, no significant differences were found. (Table VI) However, in the long term study of monthly rates, (Table VII) high rates of injury accompanied rising employment 51% of the time, while high rates occurred during falling employment only 34% of the time. This is a true difference at the 94% confidence level and thus can be considered virtually significant.

RATES HIGHER DURING RISE

Although no significant differences were found between rising and stable or falling and stable employment conditions, the fact that rates were significantly higher on the average (Table I) during rising employment and lower during falling employment adds fuel to the conclusion that there is some relationship between the rate of disabling cases and changing employment.

Severity Rate and Days Lost per Disabling Cases – Although there were no significant differences found when comparing severity rates during falling employment versus stable employ-

Employment Status	Rate of Injuries	Number of times employment status occurred	Number of times rate was high or low as stated	% of times rate was high or low as stated	Omega achieved from those %'s	t score	Omega needed for difference to be significant	Chances in 100 that difference could be due to chance	Significant Difference?
TABLE II MINOR CASES RATE FOR 49 WEEKS FROM APRIL 1959 TO APRIL 1960									
Falling Stable	High High	14 19	1 4	7 % 21 %	.29	1.166	.49	29	No
Rising Stable	High High	16 19	9 4	56 % 21 %	.53	2.207	.47	4	Yes
Rising Falling	High High	16 14	9 1	56 % 7 %	.65	2.509	.51	2	Yes
Falling Stable	Low Low	14 19	9 11	64 % 58 %	.11	.4416	.49	65	No
Rising Stable	Low Low	16 19	6 11	38 % 58 %	.28	1.166	.47	25	No
Rising Falling	Low Low	16 14	6 9	38 % 64 %	.37	1.428	.51	15	No
High Low	High High	26 23	17 6	65 % 26 %	.55	2.716	.40	1	Yes
High Low	Low Low	26 23	9 17	35 % 74 %	.57	2.815	.40	1	Yes

TABLE III MINOR CASES RATE FOR 87 MONTHS FROM JANUARY 1953 TO JUNE 1960									
Falling Stable	High High	40 23	7 6	17½% 26 %	.15	.810	.36	40	No
Rising Stable	High High	24 23	7 6	29 % 26 %	.04	.1939	.40	85	No
Rising Falling	High High	24 40	7 7	29 % 17½%	.19	1.041	.36	30	No
Falling Stable	Low Low	40 23	12 6	30 % 26 %	.07	.378	.36	72	No
Rising Stable	Low Low	24 23	6 6	25 % 26 %	.02	.0969	.40	95	No
Rising Falling	Low Low	24 40	6 12	25 % 30%	.08	.4382	.36	65	No
High Low	High Low	41 46	12 32	29 % 69½%	.58	.3819	.30	.1	Yes
High Low	Low Low	41 46	29 14	71 % 30½%	.61	.4017	.30	.1	Yes

TABLE IV DOCTOR'S CASES RATE FOR 111 WEEKS FROM JANUARY 1958 TO MAY 1960									
Falling Stable	High High	34 48	8 16	23½% 33⅓%	.16	1.010	.31	31	No
Rising Stable	High High	28 48	7 16	25 % 33⅓%	.14	.832	.33	40	No
Rising Falling	High High	28 34	7 8	25 % 23½%	.04	.171	.46	85	No
Falling Stable	Low Low	34 48	8 11	23½% 23 %	.01	.0631	.31	95	No
Rising Stable	Low Low	28 48	5 11	18 % 23 %	.11	.6539	.33	55	No
Rising Falling	Low Low	28 34	5 8	18 % 23½%	.11	.4708	.46	65	No
High Low	High High	59 52	33 18	56 % 35 %	.30	2.241	.26	3	Yes
High Low	Low Low	59 52	26 34	44 % 65 %	.30	2.241	.26	3	Yes

ment or rising versus stable employment, a very great difference was found to exist when falling employment was compared to rising employment. The severity rate was above average 56% of the time during rising employment while it was high only 32% of the time during falling employment. (Table VIII)

The data also show that the average rates of both doctor's cases and disabling cases were significantly higher during rising employment as compared to falling employment in the long run.

AVERAGE RATES

These general trends are based on average rates in the various periods covered. But is the rate more often high or more often low during these periods? This question is answered by the data in Tables II and IX. Conclusions based on this analysis follows:

Minor Cases – The rates of minor injuries were high more often during rising employment in the weekly study, but in the longer run of monthly rates, this was not necessarily true. (Tables II and III) During 1959, there was an intensive effort at the West Allis Works to complete production that had been held up during labor difficulties that spring. It is likely, therefore, that this relationship between rising employment and high rates of minor injuries exists during periods when employment increases rapidly and the plant is exceptionally busy but not during periods of normal increases in employment.

DOCTOR'S CASES UP

Doctor's Cases – The rates of doctor's cases in the long run study were more frequently high during increases in employment. This did not hold true in the short term study of weekly rates. (Tables IV and V) There are

TABLE V DOCTOR'S CASES RATE FOR 152 MONTHS FROM AUGUST 1947 TO JUNE 1960

Employment Status	Rate of Injuries	Number of times employment status occurred	Number of times rate was high or low as stated	% of times rate was high or low as stated	Omega achieved from these %'s	t score	Omega needed for difference to be significant	Chances in 100 that difference could be due to chance	Significant Difference?
Falling	High	62	14	22 %	.03	.2086	.29	80	No
Stable	High	35	8	23 %					
Rising	High	55	24	44 %	.32	2.093	.30	5	Yes
Stable	High	35	8	23 %					
Rising	High	55	24	44 %	.33	2.519	.36	2	Yes
Falling	High	62	14	22 %					
Falling	Low	62	48	78 %	.01	.2006	.29	80	No
Stable	Low	35	27	77 %					
Rising	Low	55	31	56 %	.32	2.093	.30	5	Yes
Stable	Low	35	27	77 %					
Rising	Low	55	31	56 %	.33	2.519	.36	2	Yes
Falling	Low	62	48	78 %					
High	High	71	49	69 %	.46	4.002	.225	.1	Yes
Low	High	81	30	37 %					
High	Low	71	22	31 %	.46	4.002	.225	.1	Yes
Low	Low	81	51	63 %					

TABLE VI FREQUENCY RATES FOR 111 WEEKS FROM JANUARY 1958 TO MAY 1960

Falling	High	34	12	35 %	.20	1.262	.31	22	No
Stable	High	48	10	21 %					
Rising	High	28	8	28½%	.11	.654	.33	51	No
Stable	High	48	10	21 %					
Rising	High	28	8	28½%	.10	.428	.46	64	No
Falling	High	34	12	35 %					
Falling	Low	34	5	15 %	.15	.9465	.31	35	No
Stable	Low	48	11	23 %					
Rising	Low	28	6	21½%	.03	.1784	.33	85	No
Stable	Low	48	11	23 %					
Rising	Low	28	6	21½%	.11	.4708	.46	62	No
Falling	Low	34	5	15 %					
High	High	59	37	63 %	.24	1.793	.26	7	Almost
Low	High	52	24	46 %					
High	Low	59	22	37 %	.24	1.793	.26	7	Almost
Low	Low	52	28	54 %					

TABLE VII FREQUENCY RATES FOR 152 MONTHS FROM AUGUST 1947 TO JUNE 1960

Falling	High	62	21	34 %	.01	.0669	.29	95	No
Stable	High	35	12	34½%					
Rising	High	55	28	51 %	.23	1.504	.30	15	No
Stable	High	35	12	34½%					
Rising	High	55	28	51 %	.25	1.909	.26	6	Almost
Falling	High	62	21	34 %					
Falling	Low	62	30	48½%	.04	.268	.29	79	No
Stable	Low	35	16	46 %					
Rising	Low	55	20	36½%	.13	.850	.30	39	No
Stable	Low	35	16	46 %					
Rising	Low	55	20	36½%	.16	1.222	.26	23	No
Falling	Low	62	30	48½%					
High	High	71	44	62 %	.62	5.394	.225	.1	Yes
Low	High	81	17	21 %					
High	Low	71	17	24 %	.54	4.698	.225	.1	Yes
Low	Low	81	49	61 %					

chance factors which may vary the number of doctor's cases and their effect will be felt more acutely when rates are figured on a weekly basis. Thus, the weekly rate vacillates widely and does not hold a relationship to anything that increases or decreases steadily.

The monthly rate, on the other hand, becomes a more valid measure of experience because the sampling is greater and the chance factors are somewhat alleviated.

This could be expected since the rate of disabling cases increased during rising employment. This finding leads to the question of whether cases are likely to be more severe during rising employment.

SEVERITY UNAFFECTED

The number of "days lost per disabling injury" has been used as a measure to answer this question. A similar survey of 152 months showed that individual cases were not likely to be more severe during rising employment nor during falling employment. In fact, there were no significant differences found in any of the comparisons using "days lost per disabling case."

There is a high relationship between the rate of minor cases and the employment level. Tables II and III indicate that in both the weekly and monthly rate studies, high rates occurred most frequently during periods of high employment and low rates accompanied low levels of employment.

The same relationships existed in the studies of doctor's cases and disabling cases, (Tables IV to VII). The only doubt cast on this trend is in the weekly study of frequency rates. Here the difference can be certain at the 93% confidence level. This is close enough to a significant difference to show some relationship.

Conclusions – The results of this study have shown that:

1. Minor cases increase when employment increases if the rate of employment increase is great and the shop is exceptionally busy.
2. Doctor's cases will likely increase when employment increases.
3. Disabling cases probably increase with rising employment.
4. The severity rate increases with rising employment.
5. The number of "days lost per disabling case" is not related to changes in employment.
6. Neither the frequency of cases nor the severity increases when employment decreases.
7. Rates of all kinds of cases and the severity rate are higher when employment is high and lower when the level of employment is low.
8. The number of "days lost per disabling case" is not related to the level of employment.

TABLE VIII SEVERITY RATE FOR 152 MONTHS FROM AUGUST 1947 TO JUNE 1960

Employment Status	Rate of Injuries	Number of times employment status occurred	Number of times rate was high or low as stated	% of times rate was high or low as stated	Omega achieved from these %'s	r score	Omega needed for difference to be significant	Chances in 100 that difference could be due to chance	Significant Difference?
Falling	High	62	20	32 %	.16	1.070	.29	28	No
Stable	High	35	15	43 %					
Rising	High	55	31	56 %	.19	1.263	.30	22	No
Stable	High	35	15	43 %					
Rising	High	55	31	56 %	.35	2.672	.26	1	Yes
Falling	High	62	20	32 %					
Falling	Low	62	28	45 %	.02	.134	.29	89	No
Stable	Low	35	16	46 %					
Rising	Low	55	20	36½%	.14	.916	.30	35	No
Stable	Low	35	16	46 %					
Rising	Low	55	20	36½%	.12	.916	.26	34	No
Falling	Low	62	28	45 %					
High	High	71	37	52 %	.22	1.914	.225	6	Almost
Low	High	81	28	36 %					
High	Low	71	22	31 %	.33	2.871	.225	1	Yes
Low	Low	81	43	53 %					

TABLE IX DAYS LOST PER DISABLING CASE FOR 152 MONTHS FROM AUGUST 1957 TO JUNE 1960

Falling	High	62	32	52 %	.12	.883	.29	44	No
Stable	High	35	15	43 %					
Rising	High	55	33	60 %	.24	1.570	.30	13	No
Stable	High	35	15	43 %					
Rising	High	55	33	60 %	.11	.840	.26	40	No
Falling	High	62	32	52 %					
Falling	Low	62	30	48 %	.13	.870	.29	38	No
Stable	Low	35	20	57 %					
Rising	Low	55	22	40 %	.24	1.570	.30	13	No
Stable	Low	35	20	57 %					
Rising	Low	55	22	40 %	.12	.916	.26	35	No
Falling	Low	62	30	48 %					
High	High	71	35	49 %	.12	1.044	.225	30	No
Low	High	81	46	57 %					
High	Low	71	36	51 %	.12	1.044	.225	30	No
Low	Low	81	35	43 %					

A view of the access road built by McNamara-Hislop crews into Tower Site 132, Whitehorse, Yukon Territory, which is Mile 918 on the Alaska Highway. This road winds for eight miles up Canyon Mountain to the site. A total of 42 microwave towers were built along 1,250 miles of the Highway.

Photos by McNamara Construction Ltd., Toronto

MICROWAVE PROJECT——YUKON TERRITORY

by DENNIS E. GLASGOW

INTRODUCTION – The rapid expansion of construction in the Yukon Territory has made it increasingly important to reduce the number and cost of accidents as reflected in insurance rates and direct job costs such as work stoppages, equipment damage, work to do over and loss of experience and manpower.

A good safety record is made difficult in the Yukon in comparison with that of other locations because of the rough terrain, adverse weather, labor turnover, long working hours and movement of personnel from one location to another. Many of the accidents though, are recurrences of the same basic causes and are evidence that more can be done to reduce the number.

Most contractors and superintendents freely admit that too many accidents occur because the work is hazardous and because it does present many difficulties in accident prevention. The industry for some time has realized that the reduction of accidents must be given more attention.

Safety rules by themselves will not assure a good safety record. It can be secured only by constant and careful attention on the part of the foreman and superintendents and through the cooperation of employees. On this project employees have been aware of the importance placed on safety.

ANYONE WHO MIGHT believe that the pioneering era of heavy construction in North America is over, would soon have such thoughts dispelled by a trip to the far-flung R. C. A. Victor microwave project being built by McNamara-Hislop. On towers scattered along 1,250 miles of the Alaska Highway from Grande Prairie, Alberta, Canada, through Northeastern British Columbia and the Yukon-Alaska border, crews are working in virgin territory, gouging out microwave tower sites (which are mainly built on the top of high mountains) and access roads in the wilderness of British Columbia and the Yukon which has never before been visited by men or machines. On such sites as 8-Mile Creek, Canyon Mountain and Sagish Mountain, crews have pushed

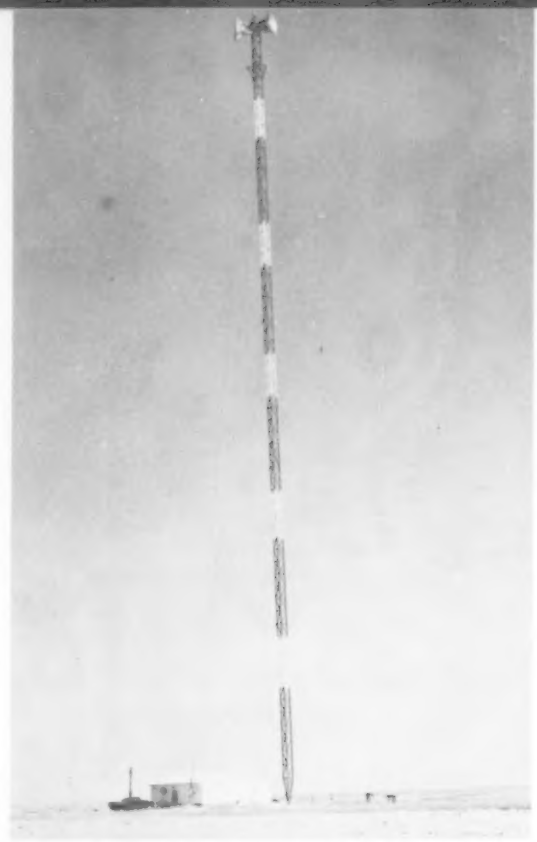
Dennis E. Glasgow, safety engineer with America Fore Loyalty Group, was safety supervisor for McNamara-Hislop during the construction of a microwave line for R.C.A. Victor from Grande Prairie, Alberta, Canada, to Fairbanks, Alaska—a distance of 1,250 miles. This article was written as the project was being completed. Prior to this Mr. Glasgow was safety supervisor for Dutton-Williams Bros. B.C., Canada.

through roads upto 14 miles in length, and where drill crews had to be extended out by ropes and belts, to drill holes for blasting on the sides of mountain tops in as rugged and remote locations as exist in North America.

To make sure of the highest safety precautions all new men as well as those familiar with this type of work are briefed every day on the hazards of this dangerous operation. Special attention is paid to the new man and a check is made on him every day to make certain he is working safely and is wearing proper safety equipment. One weak link in his safety belt or rope might cause him to drop 1,000 feet. When drilling out on the side of a mountain any defect in equipment might mean certain death. Therefore the standard rule is that every man is responsible for its upkeep and maintenance. On the job the foreman also makes a safety check on his men's equipment as a double precaution.

Even in July, it is not uncommon to see a fresh snowfall in the morning on the peaks of the mountains on which these roads are being built.

While this is pioneering work in every sense of the word, it is pioneering in a modern manner since the road-building and concrete crews operate from modern and well-equipped mobile trailer camps, which also include the newest of heavy construction equipment.



A typical completed tower site—one of the 42 on the project. Note the comparative size of the automobile and service building at the base of the tower.

ONE HOUR OF DARKNESS

One safety factor provided by the Yukon Territory is that during the summer months when two 10 hour shifts per day are working, there is only one hour of darkness. During this one hour, visibility is still clear up to about 200 feet.

To date there have been no serious accidents on this project, which I believe should be credited to the safety experience of the superintendents and foremen. Working conditions on the project carry the maximum safety procedures, which to date have paid off. But the construction of the microwave is like most construction conducted under anything but ideal conditions. The Yukon terrain can vary from pure soap to granite. Weather seems always to be unworkably wet to blisteringly hot.

Factors such as inexperience, high movement and hazardous conditions all combine to make it more than unusually difficult to start and maintain an effective kind of accident prevention program in the construction industry. However, in spite of these factors it is still true that most accidents even here are the result of ignorance or disdain for the most basic safety rules.

The educational nature of a safety program requires the interest and participation of the men for whom it is designed. This is taken care of by meetings of the safety personnel with the working personnel, where the latter can voice their ideas and opinions of the program and how well it is succeeding.

Safety in this industry (as almost everywhere else) is an educational job. The superintendents and foremen have to be educated to take an active interest in the safety program. The line operating people have to be educated to operate in accordance with this program.

Now for the building of the microwave in detail. The total project calls for approximately 130,000 yards of gravel, 80,000 yards of rock excavation and 6,000 yards of concrete. Most of the access roads call for a 60 to 100 foot right-of-way, adequate ditching, and placing of 6 inches of gravel on the 12 foot crown.

The standard tower site is 600 feet square with security fencing enclosing an area 400 feet square. This area houses the tower service building and the anchor blocks from which steel guy cables are attached to the towers for support. The towers them-

selves vary from 45 feet to 345 feet in height, depending on their location, with the shorter towers being erected on the mountain sites, and the taller ones on more level terrain. The circular concrete bases on which the towers rest are 30 inches in diameter, while the footings are 5 feet square.

At the sites with high towers, six anchor blocks are required for the 5/8 inch and 7/8 inch steel guy cables which support the towers. These are arranged in an outer perimeter of three blocks, from which the cables leading to the top half of the tower are strung and an inner perimeter of three blocks which hold the cables supporting the lower half of the towers. (A converted tank is used to put these towers up, along with the rest of the equipment needed).

In building the footings for the circular concrete base of the towers, a comparatively new method known as "Rat Hole" digging is being used. These rat hole diggers sink a circular hole which widens out into a bell shape at the bottom. The hole and bell-shaped cavity are then filled with concrete, eliminating the need for wooden forms. Wooden forms are being used however, for the foundations of the service buildings and for the anchor blocks.

MODERN CAMPS

There are nine mobile camps in operation. These camps are modern, comfortable quarters made up of aluminum trailers used for bunkhouses, kitchen, cookhouses, storehouses and washrooms. One trailer in each camp is outfitted as a first-aid trailer with an industrial first-aid attendant on duty 24 hours a day. Most of these aluminum trailers are 10 feet by 40 feet mounted on wheels and fitted with storms and screens, oil heaters and removable stairs.

Fire protection consists of two 20 pound CO_2 fire extinguishers in each trailer plus a 200 foot water hose leading from the wash trailer. The bunkhouses sleep eight to 10 men each.

Each of the camps has a mobile lighting plant, propane gas tank, mobile radio telephone and a 1,000 gallon or larger water tank. The larger camps also have well-equipped ambulances which maintain radio-telephone contact with the local relay stations.

Each first-aid man acts as safety supervisor for his spread, assuming the safety administration functions with the superintendent. For the entire territory maps show the locations of all hospitals, private ambulances, landing strips, R.C.M.P. stations and doctors. Along the Alaska highway there are also emergency first-aid stations, attended by welfare nurses.

There were two steel bridges to be constructed on this project – one a 210 foot span across the Toad River, the other a 100 foot span across Freer Creek. The camp at the Toad River site had to use a helicopter to move the crew from the camp to the tower site for some months, due to the high level of the Toad River.

The two towers near the Alaskan border will need aerial tramways for access. It was proposed that tunnels 6 by 9 feet be driven on an incline of 30 degrees to give access to the towers at these sites, rather than aerial tramways as a safety feature. At other sites it may be necessary to build auxiliary aerial tramways for passengers and light loads, since it is feared that the top parts of the access roads may be blocked by snowslides and drifts during the winter.

In spite of their isolated location, the men received mail at least three times a week. Mail is taken up the Alaska highway by bus which operates as far as Whitehorse Yukon. Urgently needed parts and supplies are flown to the nearest air-strip and trucked by co-owned vehicles into the camp concerned. The task of supplying the camps with food is a vital responsibility which has yet to fail.

If a serious accident should occur there are landing strips operated by the Department of Transportation about every 100 miles along the Alaska Highway. Also in case of emergency there is the ever-present Royal Canadian Mounted Police officer, to lend his assistance wherever needed. These men are well-trained in first-aid.

This territory is not new to McNamara Construction as they built the branch of the Alaska Highway from mile 198 to 213 in 1942. They also built the sub-structure of the 1,134 foot Riard Bridge at mile 499.

Foundation for the service building at the base of the tower at one of the sites is shown below.

Measuring SAFETY PERFORMANCE

by THOMAS H. ROCKWELL

ONE of the frustrations which has plagued those who labor in the field of accident prevention has been the problem of the measurement of safety performance. Safety practitioners and researchers alike are forced to measure the effectiveness of their work by vague, invalid and insensitive criteria such as lost time accidents, accident frequency rates or first aid cases.

The use of such poor measures of effectiveness complicates an already overly complex problem area which involves many misinterpreted, ill defined and unquantitative terms such as accident proneness, safety morale, job hazard, safe attitude, unsafe act, fatigue and safety motivation.

The problem of criterion measurement is not unique to the safety field. Measurement is an absolute prerequisite to control whether this be the control of production or accidents. Accurate measurement teamed with proper control provides prediction of future performance.

Present attempts to control accidents and their consequences can be well described as trial and error chiefly because adequate measures of the effectiveness of this control do not exist.

The safety engineer or supervisor in formulating an accident prevention program is continually confronted with this problem. Inspections, training programs, safety contests, etc., are initiated under various levels of effort and evaluated by the only measures available, namely, lost time accidents, first aid frequency or accident costs.

Because lost time accidents are rare events (especially when interpreted under ASA Z16.1-1954 R. 1959) and first aid cases are subject to serious reporting in accuracies, the safety director is faced with only an intuitive notion of the effectiveness of various accident prevention methods.

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The researcher in this field faces the same criterion problem. The inability to reproduce the accident phenomenon in the laboratory forces him to make use of criteria which are hopefully related to accidents, such as operator error (as operationally defined). Despite the fact that measurement is so critical in accident control, the majority of efforts in accident prevention have been concerned with techniques of control, such as guard design, training, etc. Little research has been devoted to the problem of how to evaluate the effectiveness of these control techniques.

One approach to this problem would be to consider some of the characteristics of a good criterion of safety performance. Of prime importance is the necessity for a criterion to be quantifiable.

Qualitative evaluation of safety performance prohibits statistical inference and opens the way for individual interpretation. The ideal criterion (a) of safety performance should permit statistical inferential procedures, because like most other measurable quantities dealing with human behavior, safety performance will necessarily be subject to statistical variation.

The criterion should also be valid or representative of what is to be measured. Does safety involve the minimization of disabling injuries and first aid cases or the minimization of all consequences of unsafe behavior and unsafe conditions? Near accidents

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or no injury accidents constitute a dilemma in this regard since their occurrence may result in a cost to the company and signal future disabling injuries. Moreover, the effect of unsafe behavior on production efficiency in the absence of property damage or injury may constitute a considerable cost to the organization and yet go on unmeasured.

Despite the fact that there is no injury or property damage, unsafe behavior of itself requires the attention of the safety supervisor. The oft-used accident frequency rate is thus a poor indicator of safety performance since it fails to take into account other associated consequences of unsafe behavior and unsafe conditions.

A third characteristic of an ideal measure of safety performance is that it should be reliable to the extent that it provides minimum variability when measuring the same condition. The repeatability of a measure is related to the accuracy or precision of the measurement itself. In safety this involves the notion of reporting.

First aid frequency has always had dubious reliability since under identical situations some workers will report for first aid while others will self-administer minor injuries. Associated with reliability is the need for a criterion to be stable. This involves the maintenance of a given range of values under repeated measure of worker behavior and environmental conditions.

An ideal measure of safety performance must also be sensitive to changes in environmental or behavioral conditions. This characteristic of a good criterion is significantly lacking in present-day safety measurement. Since lost time accidents are rare events, the initiation of a training program, for example, may not be reflected in reduced accident frequency rates.

EVALUATION IS DIFFICULT

With insensitive measures of safety preformance, the proper evaluation of accident prevention methods becomes extremely difficult. Finally, a criterion should be both efficient and understandable. Efficiency requires that the cost of obtaining and using the measurement is consistent with the benefit to be gained. Near accident measurement is a good instance of a criterion which requires excessive cost to obtain and verify.

To be understandable suggests that the criterion be of such nature that it can be comprehended by those charged with the responsibility of using or approving it. Statistical measures are often confusing to the uninitiated, and terms such as emotional instability, neurotic, etc., in addition to possessing inherent problems of quantification, have little meaning to the average manager.

These characteristics of a good criterion briefly outlined above are rarely achieved in any one measure. Sometimes a combination of measures can provide a reasonable compromise. The fact remains, however, that in the field of accident prevention, presently used measures of safety performance are inadequate in many of the characteristics cited. The criterion described below possesses many desirable criterion characteristics, particularly when viewed as a measuring instrument for research in safety problems.

CONTROL OF BEHAVIOR

Since the initiation of the safety movement after the turn of the century, more and more emphasis has been directed to the control of behavioral rather than environmental conditions which contribute to accidents. Alert safety departments armed with modern engineering methods and backed by state safety codes have eliminated the hazardous workshops which were born with the sudden industrialization of our economy.

Studies overwhelmingly point to the dominant role of unsafe behavior in accidents today. Heinrich's 88:10 ratio of personal to environmental causes of accidents while over-generalizing the situation, at least is indicative of the belief of accident preventionists (1).

Moreover, it is unfortunately true that despite efforts to safeguard equipment, workers often have little trouble removing this protection and subjecting themselves to injury. A glance at the efforts of safety practitioners shows that the principal share of time and dollar expenditures is directed at methods of promoting safe behavior. This does not suggest that unsafe conditions are nonexistent, but that the greatest gain in accident reduction lies in the elimination of unsafe behavior.

Viewed in another light, the initiation of such accident prevention methods as training programs, safety contests, propaganda, inspections, safety committees, etc., is principally designed to modify behavior and indirectly to reduce accidents. The difficulty suggested by this analysis is the problem of how this behavior is measured.

One method of measuring this behavior is to operationally define what constitutes unsafe behavior and measure the extent of its occurrence. Research has recently been conducted using activity sampling methods to estimate the extent of this unsafe behavior on a plant-wide basis (3).

This procedure has several advantages: A. it enables the collection of a large sample of behavior in a minimum of time; B. it permits the calculation of

sampling error; C. taken without operator cognizance, it provides a valid indicator of safety behavior.

The procedure essentially consists of an observer taking instantaneous random observations in time and noting whether the worker is engaged in safe or unsafe behavior. All worker behavior is thus dichotomized as safe or unsafe.

Unsafe behavior involves known violations of safety regulations or behavior which can be reasonably construed to be unsafe in consideration of existing environmental conditions. Usually the plant safety engineer and department foreman can list those instances of operator behavior which, for the particular job under study, have been known to result in first aid or lost time accidents, since the unsafe act is normally included in accident and first aid reporting.

It should be noted also that the procedure necessarily requires that the behavior be observable, e.g., it would be extremely difficult to use this method of measurement on operators working in concealed spaces.

A recent application of this method (2) was made to eight assemblers in a large aircraft manufacturing plant.[1] The eight workers included six men and two women, all of whom had been employed in this type of work for four years. Moreover, all had worked for the company for at least six years and had been equally exposed to plant safety regulations during this period.

TEST PROCEDURE

The purpose of the study was to evaluate this procedure as a criterion of safety performance in terms of its practicality, stability, sensitivity and relationship to other currently used safety criteria.

The determination of an unsafe act on this job was stipulated by the chief safety engineer and consisted principally of violations of company safety regulations and behavior specifically prohibited in this work. Each worker carried the same job description and performed the same tasks. The opportunity for commission of unsafe acts was assumed equal for every period in time since the work cycle was begun at all times throughout the day. These unsafe acts included the following:

1. Working with loose tools underfoot.
2. Working without goggles when required.
3. Working under suspended loads.
4. Failure to use guards as provided.
5. Working in unsafe postures.
6. Wearing improper or loose clothing.
7. Use of shock tools with mushroomed heads.
8. Improvising unsafe ladders and platforms.
9. Running.
10. Misuse of air hose.

The observer was instructed to take random samples (in time) of the eight operators from a catwalk above the job site. The workers were not aware of the study. In fact, in order to insure unbiased results, the department foreman was not informed of the survey until its completion.

Twenty observations of each operator were made for 17 work days. The results of the study are shown in Table 1. For each operator the daily proportion of unsafe behavior was recorded. Those days in which an operator was absent are indicated by the letter "A" followed by the average reading for that worker for the entire study.

CONVENTIONAL ANALYSIS

The data was first analyzed by conventional quality control chart methods. Figure 1 shows the group data plotted over the 17 days of the study. The data can be viewed as consisting of four distinct periods. The first period is one of stable performance; all values lie within 2 sigma limits of the average proportion of .175. The second period consists of the 3 days following the first safety inspection on the 8th day. The average proportion of unsafe acts here is .10. The third period shows the return of the group behavior to the original average proportion. The fourth period consists of the four days following the second inspection on the 14th day.

The effect of inspections on safety behavior is most striking when viewed in control chart terms.

TABLE 1.

Per Cent of Unsafe Behavior Observed for 8 Aircraft Assemblers

Day	Workers 1	2	3	4	5	6	7	8
1	16.6	35.2	31.5	00.0	21.0	16.6	5.0	21.0
2	15.8	A-25.4	33.3	5.2	20.0	5.2	10.5	27.8
3	00.0	27.8	27.8	11.1	26.3	00.0	10.0	25.0
4	29.4	33.3	47.3	00.0	22.2	15.8	5.5	21.0
5	33.3	27.8	21.0	5.2	10.5	22.2	00.0	5.5
6	36.8	29.4	20.0	5.0	21.0	5.5	00.0	10.5
7	21.0	38.8	10.5	10.5	10.5	15.8	15.0	45.0
8	00.0	11.8	15.8	00.0	5.0	00.0	00.0	16.6
9	15.8	5.9	5.9	5.5	15.8	5.0	22.2	15.8
10	10.5	20.0	5.5	5.0	15.8	00.0	5.2	22.2
11	21.0	47.0	22.2	0.0	25.0	00.0	00.0	5.9
12	15.8	25.0	42.0	5.2	16.6	00.0	15.8	26.3
13	26.3	20.0	11.8	00.0	A-14.4	11.1	15.0	33.3
14	15.8	21.0	11.1	00.0	10.5	00.0	A- 7.8	21.0
15	5.5	11.8	00.0	5.2	00.0	5.2	A- 7.8	25.0
16	11.1	10.5	00.0	00.0	00.0	5.2	A- 7.8	36.8
17	A-12.1	25.0	15.8	10.5	20.0	11.1	10.5	22.2

[1]The author is indebted to the Safety Department of North American Aviation, Inc., Columbus Division, for their generous cooperation in this study.

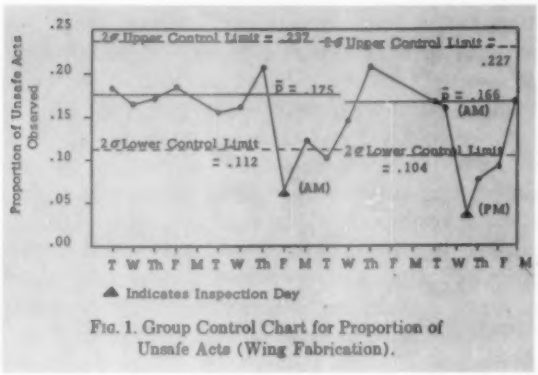

Fig. 1. Group Control Chart for Proportion of Unsafe Acts (Wing Fabrication).

The inspection on the morning of the 8th day dropped the proportion of unsafe acts from .21 to .06 and after 3 days the proportion returned to its previous level. This inspection was part of normal plant practice.

Each month the safety department made an unannounced inspection of each operating department. It was decided to coincide this inspection with the safety study to evaluate the effect of inspections on operator safety behavior. During the inspection, which took about 2 hours, both unsafe acts and unsafe conditions were checked. The assembly department received a high rating at this inspection.

At the request of the chief safety engineer a second inspection was made to evaluate the effect of consecutive inspections on the group. Although a second inspection was not usually made so soon after a previous inspection, it still had a sharp influence on safety behavior. The proportion of unsafe acts dropped from .165 that morning to .04 that afternoon and returned to normal after three days.

FURTHER ANALYSIS OF DATA

Further analysis of the data by analysis of variance methods showed that there was a significant difference at a .17 significance level between the mean performance of the individual operators. This same result was demonstrated with the data classified for all 17 days and for the 11 days of stable group performance (inspection effect removed).

With data cross classified by operator and all 17 days, the mean performance of the individual days was significant at the 5% level. With the inspection effect removed (i.e., days 8, 9, 10 and 14, 15, 16) there was no significant difference in day performance at the 20% level.

This supports the division of the total data into the four periods as shown in the control chart analysis. The difference in individual operator performance is also verified by inspection of Table 1 and the control chart analysis of Figure 2 where the behavior of two operators is shown. Worker No. 2 has the highest over-all average proportion and worker No. 4 has the lowest average per cent of unsafe behavior.

The data was also analyzed to determine the relationship between safety behavior and other indices of performance. The first question was whether one could predict lost time accidents or first aid frequency from knowledge of unsafe behavior. In examining the safety record of the eight assemblers it was found that none had ever had a lost time accident.

FIRST AID FREQUENCY

Using first aid frequency it was found that the top three of the eight workers in terms of unsafe acts accounted for 60 percent of the total first aid cases of the group. The use of rank correlation methods, however, yielded a coefficient of only +.245 when workers were ranked in terms of first aid cases and percent unsafe acts. The size of the sample of workers prohibits any conclusion about this analysis. However, there does appear to be some relationship which would warrant further investigation.

One question which is of extreme importance in using unsafe acts as a measure of safety performance is whether there is a relationship between production efficiency and percent unsafe acts. In the plant studied, no record of individual employee output was maintained, so no direct comparison was possible. After the study the foreman and assistant foreman were asked to rank the workers according to their productivity. Their combined rankings were compared to the ranking of the workers with respect to average percent unsafe acts. The resulting rank correlation coefficient was +.571.

Despite limitation in sample size the data strongly suggest that for this particular department some risks may be required for workers to be maximally

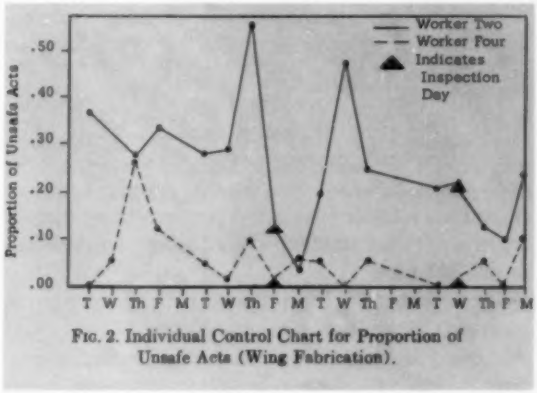

Fig. 2. Individual Control Chart for Proportion of Unsafe Acts (Wing Fabrication).

productive. This result is in sharp contradistinction to plant studies that positively relate safety and production efficiency (4).

A third analysis of the data was made to relate the occurrence of unsafe acts and time off the job (not absenteeism). The latter was available from the work sampling data. The workers were again ranked with respect to time off the job and average percent unsafe acts. The resulting rank correlation coefficient was +.552 which shows some positive relationship within the limits of the sample size. Further study might indicate whether time off the job and unsafe behavior are directly related or merely manifestations of some personal characteristics of the operator.

SUMMARY

The stability and sensitivity of this measure as demonstrated in Figure 1 in this study offers several interesting possibilities. The observed relationship between the proportion of unsafe acts and first aid frequency suggests that this measure may be used to predict lost time accidents and first aid cases *before* their occurrence. The small sample used in this study, however, prohibits any generalizations at this point.

The prospect of relating productivity and unsafe behavior certainly seems to warrant further study. It may well be that a positive relationship exists here that has been overlooked by safety practitioners. The consequences of unsafe behavior may not just be lost time accidents and first aid costs, but may involve a decrease in production efficiency and the cost associated with this inefficiency. Past research on the relation between safety and production efficiency has been on a plant-wide basis (4).

Such studies have simply shown that safe and efficient plants are compatible. This fact, however, has little significance because so many other factors are involved. An enlightened management is likely to be both safety conscious and efficient in production. With the suggested criterion of safety performance it would be possible to test this relationship on an *individual operator basis*.

Other research possibilities include the measurement of the effect of nearby accidents, safety training, supervision, propaganda methods, placement, and safety contests on operator unsafe behavior. Moreover, attitude tests could be given to workers to see if favorable attitudes toward safety are reflected in safe behavior.

If the effect of inspections on behavior can be measured as indicated in the reported study, then this might suggest the optimum allocation of inspection activity to various departments to obtain maximum results. In addition, it could provide the safety supervisor with information as to how often a department should be inspected to maintain the best results in terms of safe behavior.

If the results of this study are at all indicative, it would be possible to objectively test many of the assumed relationships in the field of safety, such as the effect of age on safe behavior. Ultimately, it might be possible to provide psychological tests which would correlate with unsafe behavior and permit better screening and placement at the time of employment.

This suggested measure of safety performance offers a new approach to the much debated "accident prone concept." Personal accident susceptibility would be measured in terms of personal exposure to accidents, i.e., unsafe behavior, instead of lost time accidents and first aid cases, with their associated reporting and causal complications.

Since this study was conducted over a short period of time and limited to a small sample of workers, no claim can be held that a breakthrough in the measurement problem in safety has been made. Many of the necessary conditions underlying this method are difficult to achieve in practice, such as independence between observations, the ability to dichotomize behavior as safe or unsafe, equal exposure to environmental hazards and equal opportunity for risk taking behavior. Furthermore, no attempt to scale the seriousness of the unsafe acts committed has been attempted.

Yet, the results of the reported study are encouraging and strongly suggest that further effort be devoted to this line of research. Certainly the magnitude of the accident problem today warrants intensive investigation. We cannot afford to be contented with our present lack of knowledge of this problem. The heavy loss of life and limb due to accidents in this country and the billions of dollars involved demand that every avenue of possible benefit be explored.

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Abstracts

SAFETY AND RELATED FIELDS

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THE American Society of Safety Engineers has established the following classifications of active membership.

ASSOCIATE MEMBER – To be eligible as Associate Member an applicant shall be at least twenty (20) years of age and

a. Shall have a degree in engineering from a college or university whose curriculum is accredited by the Engineers' Council for Professional Development or shall have legal registration as a professional engineer and, in addition, shall be engaged in safety engineering with at least one (1) year's experience, no time being credited to this one (1) year unless at least fifty (50) per cent of the time was devoted to safety engineering, or shall have supervision over the safety engineering function of his organization; or

b. Shall have a college degree other than that specified in "a" above and, in addition, shall be engaged in safety engineering with at least three (3) years' experience, no time being credited to this three (3) years unless at least fifty (50) per cent of the time each year was devoted to safety engineering; or

c. In lieu of a college degree, shall be engaged in safety engineering with at least five (5) years' experience, no time being credited to this five (5) years unless at least fifty (50) per cent of the time each year was devoted to safety engineering.

MEMBER – To be eligible as a Member an applicant shall be at least thirty (30) years of age, shall have the qualifications required for Associate Membership and also shall have (5) years' experience in addition to that required by and of a type defined in the subsection of the requirements for Associate Member which is applicable to him.

FELLOW – To be eligible as a Fellow, a Member shall be nominated upon the unsolicited recommendation of three (3) other Members, shall be at least forty (40) years of age, shall have been a Member for at least thirteen (13) years, and shall have been engaged in safety enginering for at least twenty (20) years, during at least five (5) years of which he shall have been in responsible charge of the safety engineering function of his organization. In addition, he shall have made an outstanding contribution to the safety engineering profession. Recommendations of candidates for the Fellow classification, along with substantiating data, shall be sent to the Secretary of the Society, who shall submit such recommendations and substantiating data to the Committee on Membership. The Committee on Membership shall report its findings to the Executive Committee for action. Fellows shall be elected by a majority vote of the Executive Committee.

AFFILIATE MEMBER – To be eligible as an Affiliate Member an applicant

a. Shall be at least twenty (20) years of age and shall be engaged in safety engineering with at least one (1) year's experience, no time being credited to this one (1) year unless at least fifty (50) per cent of the time was devoted to safety engineering; he may remain in this classification while qualifying for Associate Member or Member Classification; or

b. Not being engaged in safety engineering, shall be at least twenty-five (25) years of age and shall have pursuits, attainments in accident prevention, or practical experience, extending over a period of at least three (3) years, which shall qualify him to cooperate with members of the Society and to render service to the Society.

for additional information write to

The American Society of Safety Engineers
5 North Wabash Avenue, Suite 1705, Chicago 2, Illinois
(or contact your local chapter)

Voice

— From page 4

Objects to Knobs

NIAGARA FALLS, N.Y., Regarding, "Safety Gets a Lift," page 32 of the May issue, we too have just completed our annual two-day Driver Training Course, plus vision tests including peripheral vision.

We notice steering knobs shown in the illustrations. Having recently had two injuries from their use, we investigated plants and found them taboo in the four contacted. Also regarding the use of steering knobs, the Manufacturing Chemists' Association, Inc., in their Safety Guide SG-66—Fork Lift Operations, under "precautions" state:

"The steering wheel should not include a steering knob unless the truck is equipped with an anti-backlash device or is equipped with power steering."

On the basis of the above, we have discontinued the use of steering knobs.

— G. F. BRIERLEY
Safety Supervisor
Hooker Chemical Corporation

We missed those knobs. Our Accident Prevention Manual *says: "The use of steering wheel knobs is prohibited entirely by many companies. If used, they should be of the mushroom type to engage the palm of the operator's hand in the horizontal position, and should be mounted within the periphery of the wheel."*

Wants Baling Press Survey

PORT HURON, MICH. In the June issue of the NATIONAL SAFETY NEWS, page 73, we note that a "Survey on Baling Press Hazards" has been completed by the Institute of Scrap Iron and Steel. Inasmuch as we have this type of equipment in our plant, we would be very interested in reviewing this survey which we feel may be helpful to us in our accident prevention program.

— L. D. JOWETT
Safety Director
Mueller Brass Co.

The Institute of Scrap Iron and Steel, 1729 H St., NW, Washington, D.C., has sent Mr. Jowett a copy of their survey.

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CIRCLE 62 ON READER CARD

Z-16 . . .

— From page 17

ship between the event and the sprain, the committee ruled that the requirements of 5.2 had been met.

Case 732. An employee was using a pitchfork to lift small branches which had been pruned off trees around the perimeter of the plant site. As he was lifting the branches into a fire, he experienced a sharp pain in the lower region of his back. The station superintendent sent the man to a doctor who diagnosed his pain as a muscle spasm, and prescribed medication, hot packs, and rest. The injured employee lost 11 days from work.

Decision: The committee ruled the injury should be included in the work injury rates. Using the pitchfork satisfied 5.2 (a) as an incident, and in the absence of a statement by the doctor denying a relationship between the injury and the incident, it was assumed the doctor agreed the work could have produced the injury.

Case 615. A house heating installation man parked his truck in the garage after he had completed his day's work. He opened the door on the driver's side, placed his left foot on the running board, and when getting out from under the steering wheel he felt a slight pain in his lower back. He was incapacitated nine calendar days.

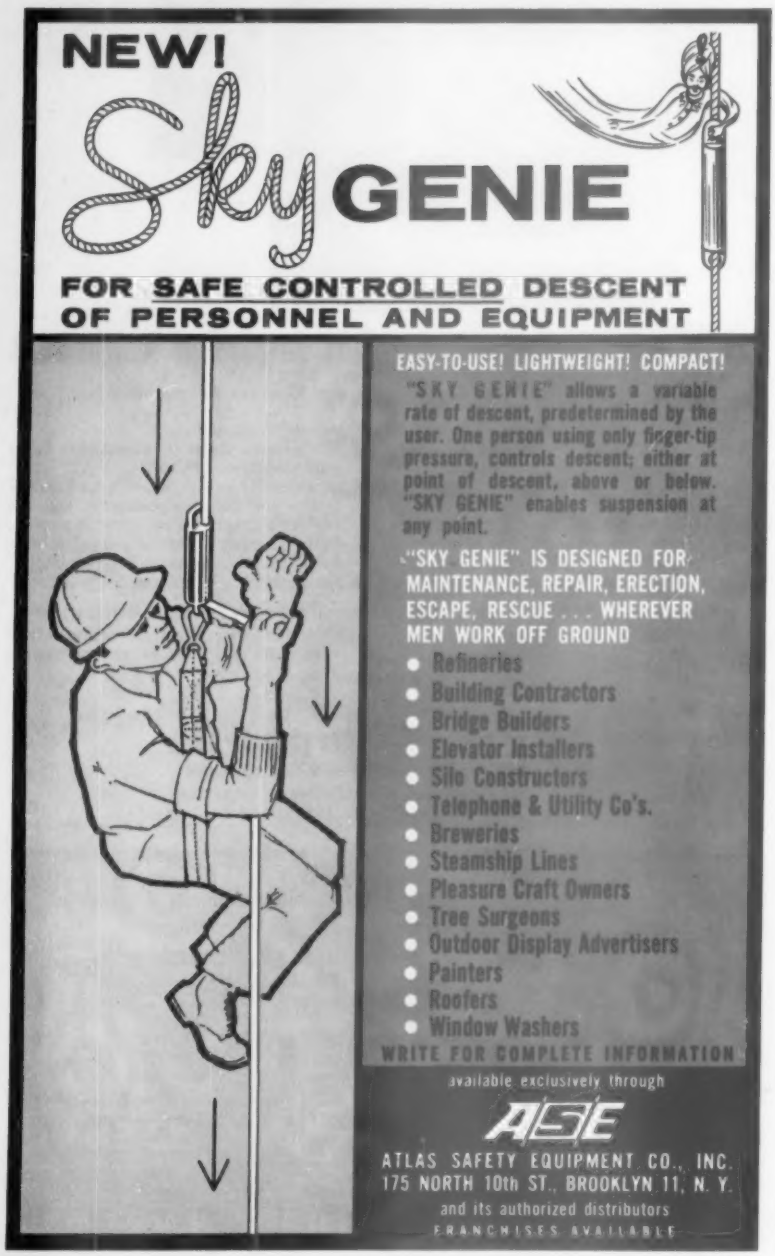
Prior to the incident, the employee had been installing house heating equipment, which was not laborious work, and he had had no discomfort. The physician authorized to treat the case was not satisfied that the incident could have produced the back pain.

Decision: The committee ruled that this case should not be included in the work injury rates since it was the doctor's opinion that there was no relationship between the disability and the incident during which it developed.

Case 597. About 10 years before the present incident, an employee suffered a back injury while working at a generating station. In the present situation, the employee was working with another employee carrying a test rack (about 5 ft. long and weighing about 40 lbs.) from the roof to the third floor of the testing laboratory. It was a two-man job, and the rack had to be brought down the stairway to a truck on the third floor. It was awkward carrying the rack, and the employee believed that in twisting around he had reinjured the base of his spine. He felt a dull, aching pain in his back and had difficulty in straightening up. He mentioned this fact to the other employee, but continued to work.

The ailment flared up at different intervals after the incident and he received diathermy treatments at the dispensary. He lost three calendar days from work.

Decision: The committee ruled that this case should be included in the work injury rates. Carrying the test rack satisfied part (a) of 5.2 as an incident, and in the absence of a statement from the doctor, the committee assumed the company was satisfied that part (b) had also been met.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CIRCLE 63 ON READER CARD

1960 Death Rate Low

— From page 35

and drownings were 10 per cent. Motor-vehicle accidents led in the next two age groups, with 53 per cent for 25 to 44 years, and 44 per cent for 45 to 64 years. Among persons 65 years and over, fatal falls made up 55 per cent of all accidental deaths.

Three catastrophes in 1960, all airplane accidents, caused more than 50 deaths each. There were, however, five other catastrophes in which 25 or more persons died.

Motor-Vehicle Accidents

There were approximately 38,200 deaths from motor-vehicle accidents in 1960, a 1 per cent increase from 1959.

The vehicle mileage total rose in 1960, thus bringing the death rate per 100,000,000 vehicle miles to a new all-time low of 5.3.

Disabling injuries resulting from auto accidents in 1960 numbered about 1,400,000. Costs, including wage loss, medical expense, overhead costs of insurance, and property damage amounted to $6,500,000,000.

A fourth of the auto deaths, 10,500, were from accidents in cities and towns with more than 2,500 population; three-fourths, 27,700, from accidents in rural areas and towns under 2,500 population.

There were approximately 7,750 pedestrian deaths, a decrease of 1 per cent from 1959, and 30,450 non-pedestrian auto deaths, a 1 per cent increase.

The age distribution of automobile deaths, and changes from 1959, were as follows:

Age	1960	1959	Change
0 to 4	2,000	1,842	+9%
5 to 14	2,700	2,719	−1%
15 to 24	9,100	8,969	+1%
25 to 44	10,200	10,358	−2%
45 to 64	8,300	8,263	0%
65 to 74	3,600	3,487	+3%
75 and over	2,300	2,272	+1%

Work Accidents

The 1960 death total for work accidents was approximately 13,800, the same as the 1959 total. Disabling injuries numbered 1,950,000. The death total excluding agriculture was about 10,500, of which 1,700 occurred in manufacturing industries. Total cost amounted to about $4,400,000,000.

In addition to the 13,800 workers killed while at work, 29,200 died from off-the-job accidents—a death total of 43,000. Workers injured in both kinds of accidents numbered about 4,200,000.

Home Accidents

Home accident deaths in 1960 totaled approximately 27,500, or 500 more than the revised 1959 total. There were about 4,100,000 disabling injuries. Costs—including wage loss, medical expense and overhead costs of insurance—amounted to $950,000,000.

Falls caused more than two-fifths of the deaths; burns, nearly one-fourth; all other types, only one-third.

Almost half of those killed were persons 65 years old and older. More than a fourth were children under 15 years. The remaining fifth

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CIRCLE 64 ON READER CARD

were persons between the ages of 15 and 64 years.

Public Accidents

There were approximately 16,500 deaths in public non-motor-vehicle accidents during 1960, no change from 1959. Disabling injuries numbered approximately 2,050,000, of which 50,000 were permanent impairments. Wage loss, medical expense and overhead costs of insurance amounted to $850,000,000.

Nontransport drownings comprised one-fourth of the deaths. Falls and transportation accidents (rail, air, water, and other—not involving motor-vehicles) each accounted for about one-fifth. All other types contributed about one-third of the death total.

Deaths were distributed by age about as follows: 25 to 44 and 45-64 had about one-fifth; 75 years and older, one-sixth; 5-14, 15-24, and 65-74 each one-eighth; children under 5 less than one-tenth.

Airplane Accidents

In 1960 there were 326 passengers and 37 crew members killed in 10 accidents occurring in the domestic passenger-carrying operations of scheduled air carriers. The passenger death rate was 1.01 per 100,000,000 passenger miles, compared to 0.69 for 1959. Total deaths in all aviation accidents numbered about 1,400.

Railroad Accidents

In 1960 there were 33 passengers and 8 crew members killed in passenger train accidents. The passenger death rate was 0.16 per 100,000,000 passenger miles compared to 0.05 for 1959.

Total deaths in all railroad accidents numbered 2,345, a 5 per cent increase from the 1959 total according to the Interstate Commerce Commission. Injuries decreased 2 per cent to 19,480. Grade crossing deaths numbered 1,421 compared to 1,268 in 1959. Trespasser fatalities went down 4 per cent to 637.

Fire Losses

The 1960 estimate of fire losses in the United States was approximately $1,108,000,000, according to the National Board of Fire Underwriters, 6 per cent more than the comparable 1959 total.

"Massacre" Repeated

CBS Reports' "The Great Holiday Massacre" will be repeated on the CBS Television Network Aug. 31, 1961, the Thursday before the Labor Day weekend. This award-winning hour-long documentary was first seen Dec. 26, 1960, and threw a national spotlight on the genesis and aftermath of typical traffic accidents occurring in different parts of the country during the previous peak-travel Labor Day weekend.

Dramatic on-the-spot reporting gave a penetrating picture of the people and conditions involved in the crashes, along with sharp analytical comment by police and safety experts.

The National Safety Council served as consultant for the CBS Reports team headed by Fred W. Friendly. Edward R. Murrow narrates the program.

"The Great Holiday Massacre" was cited by the National Safety Council with its Public Interest Award to the CBS Television Network and the sponsor, Philip Morris, Inc.

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CIRCLE 65 ON READER CARD

Grinding Wheels

– From page 28

the wheel to protect the operator and all others in the vicinity.

4. Serve as source of information regarding use or adaptation to different jobs of their machines. Just as the grinding wheel manufacturer has the duty to answer questions concerning the use of his grinding wheels, so machine builders are responsible for answering questions concerning application of their machines.

In particular, the machine builder must advise against operations which he considers to be dangerous on machines built by him. If, after being advised against an operation on a particular machine, the user proceeds to do the job on that machine anyway, the user insisting on such unsafe practice lifts responsibility from the machine builder and the wheel manufacturer and places it squarely on himself.

Responsibilities of The User

Grinding wheel users outnumber grinding wheel manufacturers and grinding machine builders many times over and are under constant pressure to "get the job done fast and at low cost." Consequently, many users are unaware of hazards inherent in misuse and abuse of grinding wheels, while others choose to ignore hazards partially or completely. By "user" we refer to everyone in the plant where the grinding wheel is used with even the slightest responsibility for seeing that the wheel is used in a manner intended by the wheel manufacturer.

This includes many persons from top management to the machine operator. The user should:

1. Provide safe machinery and enforce safe use of that machinery. While the builder is responsible for seeing a safe machine is shipped to the user, it is the latter's sole responsibility to insure that the machine remains safe.

The user alone must insure that the guards that have been supplied with the machine are not removed, and the machine is maintained in good repair.

2. Provide safety equipment to protect the operators and insist on its constant use. Safety glasses, gloves, thick aprons, and safety shoes are necessary on many operations but furnish positively no protection when "in the top drawer of my tool chest."

3. Make certain that the grinding wheel has not been damaged from the time it left the manufacturer's plant until the time of mounting on the machine. The manufacturer has no control over the wheels after turning them over to the shipping company. It is the responsibility of the user then to check the wheels upon their arrival to see that they have not been damaged in transit.

The user must transport the wheels safely in his own plant and must store and stock them properly in his stockroom. And immediately prior to mounting, vitrified wheels should be subjected to the simple "ring test" in which the wheel is tapped lightly to produce a good wheel ringing tone or a cracked wheel thud.

4. Demand that grinding wheels be run only in the scope of their

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capabilities. Just as many automobile accidents involve excess speed, most accidents with grinding wheels are caused by over-speeding.

Only the user can know that the maximum safe operating speed shown on the wheel, the blotter, or tag on the box, is never exceeded. If this maximum safe operating speed should become separated from the wheels or should become unreadable through wear, the user must not use the wheels at any speed until he has again been given the maximum safe speed from the wheel manufacturer.

Safety rules in addition to those concerning speed must also be observed. Thin wheels cannot stand excessive side pressures. Vitrified wheels may be cracked by bumping. Stresses can be caused within a wheel by severe quick changes in temperature. All these conditions are within the control of only the user.

5. Educate persons in receiving, inside trucking and stock departments, setup men, wheel mounters and balancers, and most important, the grinding machine operators. Instruct these workers on the safe handling, storage, and use of grinding wheels.

For safe grinding, this education is a continuous program without end. Wheel manufacturers and machine builders can and do provide instructional material on their products and their use, but only the user plant can see this information is made available to the individuals working with grinding wheels and grinding machines.

This article hasn't mentioned all responsibilities of all parties in the field. Special situations will create special responsibilities for any or all three groups – the wheel manufacturer, machine builder, and user.

An excellent guide on safe grinding is the set of instructions and the explanations of these instructions in the *American Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels.*

This code, sponsored jointly by the International Association of Government Labor Officials and the Grinding Wheel Institute, may be obtained free from the Grinding Wheel Institute, Keith Building, Cleveland, Ohio, or from any member of the Institute.

Off Job Survey

— From page 38

programing, and almost as many operations said injury information couldn't be obtained because of lack of cooperation by employees. More than a dozen companies linked failure to start an off-the-job activity to lack of management interest and the feeling that such a program couldn't be properly administered or adequately followed up.

About the same number of firms said off-the-job efforts are handled by or through local safety councils or by corporate offices.

Various companies said the cost of an off-the-job program would be too high and consequently not worth the expense. Three reports said union opposition to the program is strong, or management has been informed by unions that the employees' privacy shouldn't be violated under any circumstances.

Several respondents didn't feel they should expand company liability or enlarge the scope of company benefits.

Certain comments from firms replying to queries on Section II might be worth mentioning at this point.

"O-T-J program has been proposed but considered by staff as being outside of our authority to control an employee's private life. O-T-J program would be difficult to administer because many single employees on field survey crews live in rented quarters away from permanent homes. Small amounts of home safety material are circulated for the information of office employees."

"The reason we are not starting an off-the-job safety program is that we feel we still have on-the-job safety problems to be solved, and a need for continued emphasis of on-the-job safety is our primary concern. However, we have done some incidental work pertaining to off-the-job safety through movies and safety talks by employees in various departments."

"We need one—I know it would pay for itself by reducing group-insurance claims and lost work time."

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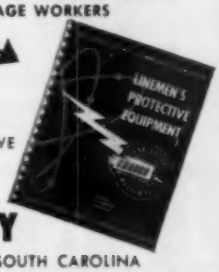

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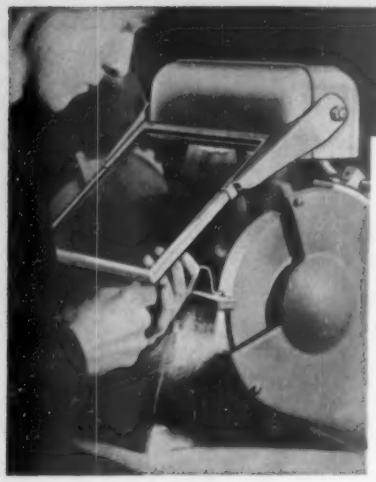

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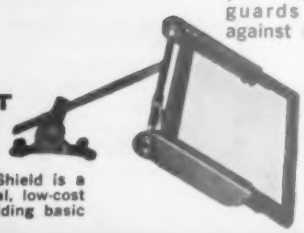

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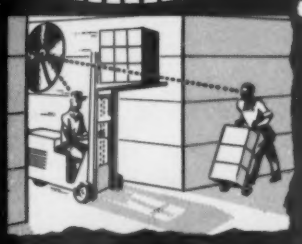

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JOSEPH DYBEL, pipe fitter, American Oil Co., Whiting, Ind.—resuscitation after gas asphyxiation.

CHARLES M. CHESTERFIELD, maintenance foreman, Hooker Chemical Co., Niagara Falls, N.Y. —resuscitation after gas asphyxiation.

JOHN ESTES, quarry foreman, Northwest Magesite Co., Chewelah, Wash.—resuscitation after gas asphyxiation.

ROGER C. SCOTT, pumper, Texaco Inc., Odessa, Tex. – resuscitation after gas asphyxiation.

FRED KENDER, electrician, American Oil Co., Whiting, Ind.—resuscitation after drowning.

JOHN J. CORCORAN Jr., lineman's helper, Philadelphia Electric Co.—resuscitation after drowning. Certificate of assistance to DON C. KENLEY, special assistant, Philadelphia Gas Works.

DOUGLAS F. BEANE, lineman, New York Telephone Co., Virgil, N.Y.—resuscitation after gas asphyxiation.

WILLIAM F. GRABOSKY JR., New York Telephone Co., Syracuse, N.Y. —resuscitation after convulsions.

CHARLES E. LAZURE, electrical engineer, U.S. Army Engineer District, Omaha, Neb.—resuscitation after electric shock.

EARL D. GRAYSON, lineman, Union Electric Co., Flat River, Mo.—resuscitation after accidental choking.

ROLAND L. FINK, chief transmission man, Pacific Telephone and Telegraph Co., San Francisco, Calif. —resuscitation after drowning.

NEW SAFETY EQUIPMENT

Products listed in this section have been reviewed by a committee of the Industrial Department of the National Safety Council. Only those which comply with the advertising policy of the National Safety Council are accepted. However, the information is based on literature from the manufacturer, and the Council does not accept responsibility for statements or claims made herein. Nor does the listing of a product in this section imply endorsement by the National Safety Council.

"Ear" Checks Audiometers

Rudmose Model RA106 Electro-Acoustic Ear, a portable instrument for checking the gross calibration of audiometers, has been developed by Rudmose Associates for distribution by INDUSTRIAL ACOUSTICS CO. INC., New York, N.Y.

Designed for field use, the completely transistorized RA106 utilizes two 9-v batteries and one 30-v battery. With only four switches controlling its entire operation, the instrument may readily be used by non-technicians, while at the same time it has enough features to satisfy most laboratory needs.

The RA106 contains two dynamic microphones, each mounted in a special coupler and calibrated at 8 discrete frequencies (250 through 8,000 cycles per second) for checking manual audiometers. An internal oscillator permits rapid electrical calibration of the amplifier.

A feature of the RA106 is that, in addition to checking the calibration of manual audiometers, it can also be used to check automatically the calibration of Bekesy type audiometers (Rudmose Models ARJ-3 and ARJ-4 and Grason Stadler E800).

The RA106 weighs 5½ lbs. and measures 6" x 5¼" x 9½ in. high.

(Item 150)

UtiliPort

THE MODERN FOLDING STRETCHER

Why use an old-fashioned Army-type folding stretcher when for so little more you can have the modern UtiliPort?

COMPARE		
MODERN UTILIPORT		OLD-FASHIONED ARMY TYPE
Anodized aluminum. No rust—won't burn or rot.	POLES	Wood
Non-ripping vinyl-impregnated nylon. No rot or mildew. Acid- and flame-resistant.	BED	Canvas
Cadmium-plated sleeves and anodized aluminum alloy hinges.	JOINTS & HINGES	Painted steel
7-1/4 lb	WEIGHT	25 lb
More than 400 lb	LOAD CAPACITY	Dependent upon age and condition of canvas and wood
37" x 3" x 3"	DIMENSIONS FOLDED	48" x 7" x 4"

UtiliPort #450 only $34.00 . . . see your MSco distributor

Medical Supply Company *Specialists in first aid*

Dept. AB1, Rockford, Illinois

CIRCLE 73 ON READER CARD

Clamps Available Rubber Dipped

CHARLESTON RUBBER COMPANY has announced addition of rubber-coated, slip-resistant clamps to its line of Charco "Bulldog" blanket and wire clamps.

Any of the several clamps in the Charco "Bulldog" line may be had with this non-slip rubber coating at very slight additional cost over the cost of uncoated clamps.

The non-slip rubber coating is obtained by dipping Charco clamps into a special roughening solution of neoprene rubber. The clamp then is subjected to heat, which cures the rubber and bonds it firmly to the wood. Charco rubber coated clamps are resistant to absorption of oil, water, creosote and other chemicals.

(Item 151)

Ladder Supports Two Men

This heavy duty platform ladder manufactured by The DAYTON SAFETY LADDER CO., Cincinnati, Ohio, permits two men to work from it at the same time.

In addition to wide steps and a roomy work platform on one side, the ladder features sturdy dowel-type steps on the opposite side. These steps are reinforced with heavy steel supports for maximum safety.

Available from 4 to 16 ft. Also featured is a generously sized work shelf at the top, easily accessible from both sides, for placing tools, boxes and other equipment and supplies required.

When the ladder is not being used it folds for flat storage.

(Item 152)

Anti Slip Coating

A permanent solution to slippery areas, Magic Non-Skid Anti-Slip Coating for safer surfaces, is a new product of the SILICONE PAPER CO. OF AMERICA, 230 Park Ave., New York 17, N.Y.

Factory-tested for over a year, this epoxy product will provide excellent protection against slips and resultant falls. When applied to a properly prepared surface, MAGIC COATING is fully guaranteed to give a durable and safe surface to wood, concrete or steel. Absolutely unaffected by weather, it is applicable for floors, walkways, stairs and ramps, both indoors and outdoors.

(Item 153)

Gentex Markets Commercial Blasting Cap Carrying Case

GENTEX CORP. New York, are marketing a blasting cap carrying case.

The carrying case is constructed of extra tough nylon mesh outside and padded with nylon inside to give maximum protection.

Protection is further insured by the overlapping folds of the case which are securely bound by heavy duty straps. The case is a vivid, warning red.

The compartments within the wrap-around folds of the case provide for the transporting of five detonator caps.

(Item 154)

ABC Chemical In Six Models

A new dry chemical extinguishing agent, effective on Class A, B and C fires, has been introduced by ANSUL CHEMICAL CO., Marinette, Wisconsin. Known as 'Foray', it is the first multi-purpose dry chemical to be offered in a complete line of hand portable extinguishers or in cartridge-type extinguishers. 'Foray' can be obtained in any one of three sizes in either cartridge or stored pressure type extinguishers.

With the purchase of the new agent, users will have the added versatility of ABC dry chemical without making a large investment in new extinguishers. Conversion kits which will adapt most Ansul hand portable extinguishers now in service to the use of "FORAY" dry chemical are available.

Barring a few necessary changes, the extinguishers are substantially the same as the D-Model line.

Model numbers are the same in both the cartridge and stored pressure type "FORAY" units. Model 10 contains 8½ lbs. of dry chemical; model 20 contains 17 lbs.; and model 30 contains 25 lbs.

(Item 155)

Cleaner Does 4 Jobs

Four cleaning operations in vacuuming, blowing, air sweeping and spraying, can be done with the all-purpose cleaner introduced by ACE-SYCAMORE, INC., Sycamore, Illinois.

The unit, Model 105, features advantages such as large rear wheels for maximum mobility, a convenient holder for carrying attachments and a handle for easy maneuvering, even on steps.

As a vacuum cleaner, it can be used with either 1½" or 2 in. hose and attachments. As a blower, air sweeper or sprayer, the power unit is used separately from the tank and held in the hand.

The cleaner can be used for wet or dry pickup and the 15 gal. tank is available in regular steel with baked enamel finish, or stainless steel.

A recommended set of attachments include a hose, wand, 14 inch floor nozzle, 3" round dusting brush and dust bag. Over 100 standard attachments are available.

The motor is 1⅓ h.p., two speed, universal type with permanently lubricated bearings. 115 v. AC-DC is standard, but other special voltages are available.

(Item 156)

Steel Straps Eliminated In Rail Car Retainer

BEMIS BRO. BAG CO. has developed paper retaining strip that prevents slippage of rail-shipped products into storm doorways.

The new retaining strips have no steel bands and require no special tools or materials.

Constructed of heavy-duty extensible kraft paper reinforced with Fiberglas scrim and rovings, the new retaining strips are installed across the doorway by built-in nailing strips. The strips are randomly nailed to the car wall about six inches from each side of the doorway, allowing the cooperer to bypass parts of the wall that have been splintered by previous nailings.

Trade-marked "Ship-Safe," the retaining strips are available for 6- through 10-foot doorways in heights of 2 and 3 ft. They are packed in compact units of 25.

(Item 157)

Product Reduces Slips, Fire Hazards

A new chemical product designed to eliminate fire and slip hazards from oil and gasoline spills has been developed and is being marketed by THE PENETONE CO., Tenafly, N.J. The product, called Slix, is non-flammable, non-toxic, odorless, and is useful in breaking up oil slicks and removing flammable solvents from almost any surface.

Slix shatters oil film into microscopic particles, chemically coats each droplet and surrounds it with water. When the oil is dispersed, it may be flushed into drains without endangering the walls of the sewer system.

Spills of gasoline, naphtha or turpentine will remain dispersed up to 24 hours. Oil spills, however, will remain fully controlled for approximately three hours depending on the size of the spill and the amount of product applied. If the oil returns to the water surface again, it can be redispersed with a high pressure spray or other type of agitation.

Will not injure asphalt runways or stain concrete walks. When properly diluted, it can be used to clean fire hoses and other fire fighting equipment.

(Item 159)

Emergency Cold Pack

The problem of producing an ice pack for emergency purposes when no ice is readily available is said to be solved by Kwik-Kold, a product of International Latex. Kwik-Kold is a plastic package of chemicals that becomes an instant cold pack for fast first aid treatment. It provides 20°F. cold within two seconds after being activated by squeezing the package. Temperature is maintained for approximately 30 minutes. Small, light and convenient to use, Kwik-Kold consists of an outer bag containing chemical crystals and an inner bag containing a liquid. A slight pressure on the entire package breaks open the inner bag and the cold is produced when the two chemicals mix. The package is made of a tough plastic. The manufacturer claims that the contents are harmless in the unlikely event that the outer bag should be punctured. Kwik-Kold is a product of INTERNATIONAL LATEX CORP., 350 Fifth Ave., New York, N.Y.

(Item 160)

"Welded" Aluminum-Asbestos Fire-Resistant Cloth

KEASBEY & MATTISON CO., Ambler, Pa., has introduced a new type of fire-resistant cloth for fire entry and approach garments. It is also recommended for such products as fire curtains, baffles, reflective blankets, folding doors, and partitions.

Called Kamklad, the new material is a combination of aluminum foil and high quality fire-resistant asbestos cloth, "welded" together by a new process.

Advantages Listed

Kamklad is said to have the following advantages:

1. High resistance to heat and abrasion because the solid aluminum barrier is 50 times thicker than vapor deposition products.

2. Good wearing characteristics because the tightly woven yet flexible asbestos cloth retains its shape, construction, and strength even after direct exposure to fire or water. No glass yarn or filament is used in Kamklad.

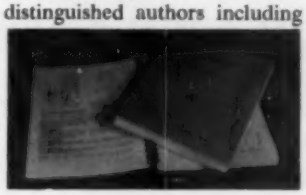
3. No peeling or cracking because the method used to bond the aluminum foil to the asbestos cloth causes the two materials to act as one.

Available in standard ½ mil foil, in full 40 in. width.

(Item 158)

AIR SAMPLING INSTRUMENT MANUAL

A valuable reference published by the *Air Sampling Instrument Committee of the American Conference of Governmental Industrial Hygienists.* It is an up-to-date compendium of instruments containing comprehensive descriptive information on the uses, operating principles, physical descriptions, performance data, operating instructions, maintenance instructions, and commercial source, if any, for almost all of the air sampling instruments currently in use in the United States. In addition, it contains authoritative discussions on air sampling techniques and theory by distinguished authors including Professors Leslie Silverman of the Harvard School of Public Health, and Theodore Hatch of the University of Pittsburgh School of Public Health. **Purchase orders should be forwarded to: Secretary Treasurer, A. C. G. I. H. 1014 Broadway, Cincinnati 2, Ohio** *$7.50 per copy.*



CIRCLE 77 ON READER CARD

CIRCLE 78 ON READER CARD

FOUNDRIES NEED SAFETY EQUIPMENT

Fact: The foundry industry uses more personal protective equipment than any other industry of similar size. Result: You will rate TOP attention from 16,000 foundrymen with a display of your equipment at

THE BIGGEST FOUNDRY EXPOSITION IN 10 YEARS

66th CASTINGS CONGRESS and EXPOSITION

PLUS

29th INTERNATIONAL FOUNDRY CONGRESS

DETROIT
MAY 7-11, 1962
COBO HALL

FOR SPACE
WRITE, WIRE, PHONE

AMERICAN FOUNDRYMEN'S SOCIETY
GOLF & WOLF ROADS
DES PLAINES, ILL. • VA 4-0181

Skin Protection Program

A new program of skin and product protection has been developed by INDCO LAB, Santa Monica, Calif. to gear its skin conditioner, protective glove, water rinse hand cleaner, and waterless skin cleanser to meet the needs of individual plants.

An introductory kit is available that meets the needs of 4 workers for a 30 day evaluation.

(Item 161)

Self-Stick Label For Durable Identification

LABELON TAPE CO., Canadaigua, N.Y., a division of Labelon Corp., has a new self-sticking label especially designed for use in laboratories and hospitals or for permanent indoor usage.

MC-L Labelon consists of a pressure-sensitive matte material that can be written or typed on and then covered with an attached clear layer of Mylar plastic for permanent protection. It is particularly adapted for use on rounded or curved surfaces.

The special Mylar covering is designed to resist water, dirt, and sunlight, and is not affected by grease, oil or acids. The writing under the cover cannot be altered or marred in any way, and the labels resist heat up to 300° F., or cold down to —100° F. Labels are available with colored borders in black, blue, red or green for filing or indentification purposes, and are conveniently packaged in small tray-type boxes. Sizes range from ⅝ x 1½ in. up to 2 x 3¼ in.

(Item 162)

Headgear Features Free-Floating Design

A new, free-floating, welding helmet headgear of plastic fabrication is now being produced by the FIBRE-METAL PRODUCTS CO., Chester, Pa.

Designated 3-C Headgear, the unit is not affected by moisture, is flexible for comfortable conformity to any head, and is adjustable to fit around and on the crown of the user's head.

The free-floating design avoids direct head contact with the helmet shell. There are no side pressures or front-to-back pressures imposed by the welding helmet.

All metal parts are aluminum for corrosion resistance, light weight and better durability. The new ratchet adjustment is designed for a gloved hand.

When the QUICK-LOK® Attachment is installed, the headgear may be removed from the helmet and replaced by a QUICK-LOK-equipped safety cap.

(Item 163)

Sub-Zero Fire Fighting Equipment

Piercing cold and the lack of precipitation in Antarctica rules out water for fire-fighting purposes. So the U.S. Navy uses this type of mobile fire sled for protection at its McMurdo Sound base. On the sled is a tank containing 500 pounds of dry chemical which can be expelled through hose lines and nozzles by nitrogen stored in a 400 cubic foot cylinder. A small nitrogen-filled gas cartridge also pressures the 30 pound dry chemical extinguisher mounted behind the main tank. The equipment was engineered and designed for the Navy by ANSUL CHEMICAL CO., Marinette, Wis.

The equipment in Antarctica has rubber hoses of a special composition which resists hardening and shattering in the extreme cold. Nitrogen gas is used as the expelling force in all ex-

tinguishers because the carbon dioxide used in more temperate climates can't maintain the required pressure in low temperatures. The mobility of the fire-fighting sled, designed especially for airplane crash fires, also makes it useful for general fire protection on base.

(Item 164)

Hood Has Replaceable Apron

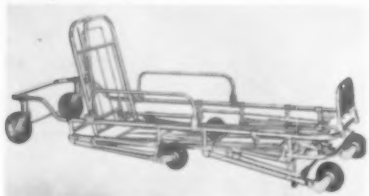
A Duratex rubber-front apron and inner bib that are zipper-attached to the head-and-shoulder canopy are features on an abrasive blasting hood announced by the CHICAGO EYE SHIELD CO. Either apron or bib can be zipped on or off without replacing the whole canopy. The canopy, also made of long-wearing Duratex rubber, has a 4½- x 5¼-in. window opening.

Neoprene lens retainer holds laminated backup lens, Perma-Clear cover lens and perforated steel cover plate. The new one-piece hood is available with optional choice of skull cap, hard cap or G-3 Hed-Rite (nylon) headgear with broad bearing cross strap and ratchet adjustment.

Air supply system is designed for low pressure (5 to 25 lbs.). Air travels from air valve assembly mounted on belt, through flexible hose, and enters distribution hose which releases air through diffuser bags. Bags filter the air and prevent blowing.

(Item 165)

One Man Handles Compact Cot



A one-man operated ambulance cot that lets patients ride in full sitting position in headroom less than 35 in. has been introduced by the FERNO MFG. CO., Greenfield, Ohio.

Called the Model 27, the new cot permits carrying patients who must remain in an upright position, such as cardiac sufferers, in vehicles that do not have sufficient headroom when using ordinary cots.

Maximum headroom is gained by designing the Model 27 with a unique recessed bed. The bottom of the bed is just two inches from the floor of the ambulance, cradled by the cot frame and wheels.

The cot, also permits one man to load and unload patients without any lifting. The front wheels are car-floor height, the cot ready for entrance into the car, with no bending over or lifting of the cot from the ground up to the floor of the car.

As the cot is pushed into the car, the front legs fold up. After the cot's center of gravity is inside the car, the back legs fold up, allowing the cot to glide into the car. A new telescoping handle at the foot of the cot lets the operator push the cot the last few feet without having to bend over the car bumpers or tailgate.

Made of strong, tubular aluminum, the model fits standard cot fasteners. The backrest can be adjusted to any of five positions. The foot of the bed is turned up to prevent the mattress from slipping. Side arms fold down for patient transfer.

Optional equipment includes safety belts, a wide range of mattresses and covers, and floor cups for rear posts.

Overall length of the new Ferno Model 27 One-Man cot is 75 in., width 24 in. and height (when fully raised) 31 in. Weight is 57 pounds.

(Item 166)

Temple Mounted Shields Provide Side Protection

A new plastic side shield, permanently attached to temples, is available for Fendall Multi-Fit bridge safety glasses. These provide side and increased frontal protection while adding only 14/100 oz. to total weight. Shields of this type give the further advantage of permitting temples to fold flat when glasses are not in use. Clear shields mounted on skull temples are illustrated. Green shields for glare reduction are also available. Either color may also be obtained on cable type temples. In addition to the Multi-Fit series, whic his now offered in flesh, smoke and cordovan colors, these utility shields may be obtained in a two-tone series of frames with fixed or adjustable nose pads. FENDALL COMPANY, Chicago, Ill.

(Item 167)

CIRCLE 79 ON READER CARD

VALUED FOR

Performance

TM

alloy slings

Consistent, full-duty performance is routine for TM Alloy Slings. That's why they are preferred for heavy material handling in all types of industry. Controlled heat-treating . . . brute strength . . . and scientific quality control, all have an important bearing on this enviable record. Call your distributor, steel warehouse, hardware wholesaler or write for Bulletin 14A.

S. G. TAYLOR CHAIN CO., Inc.
Plants: Hammond, Indiana
3505 Smallman St., Pittsburgh, Pa.

Prompt repairs on alloy slings in both plants.

Taylor Made CHAIN SINCE 1873

First Aid for Rocket Fuel Burns

A phosphate buffer called NEUTRALIZE acts on contact to relieve suffering and safeguard delicate tissues. It washes off and counteracts the outer layer of the chemical, then the danger area—the layer of chemical next to the tissue. Finally, it penetrates the surface to inactivate chemicals that water cannot reach.

For treatment of burns caused by the hydrazine family of poisons, NEUTRALIZE is recommended by the maker because these chemicals are miscible with water and alcohol, and form salts with inorganic acids. Aniline, also, combines with acids to form salts and therefore NEUTRALIZE is recommended for its destruction.

Burns caused by fuming nitric acid, kerosene and hydrogen peroxide respond to immediate washing with either water or NEUTRALIZE. The latter is superior to water, however, because a small amount of NEUTRALIZE takes effect immediately—whereas large quantities and long irrigation periods (at least 15 to 30 minutes) are necessary when water is the irrigating agent. For this same reason, NEUTRALIZE is highly effective in treating eye burns.

For additional information on NEUTRALIZE (available in 2-, 4-, 8-, and 32-oz., and 1 and 5 gal. polyethylene bottles), write the E. D. BULLARD CO., Sausalito, Calif.

(Item 168)

Surround Yourself

WITH

Accident Prevention

ON YOUR TRIP
DON'T LEARN
THE TRAFFIC LAWS
BY ACCIDENT

WOOSIER UNIT INDIANA ARSENAL
IT CAN HAPPEN TO YOU
STAY ALERT
DONT GET HURT

The constant "newness" of changeable copy signs is what makes them effective where the permanent type fails.

Wagner displays are quickly changed without ladder climbing.

Only Wagner Letters can be successfully changed by means of a "mechanical hand."

SAFETY "IT PAYS"
TO BE YOUR
BROTHER'S KEEPER

SAFETY TODAY
TOMORROW
MAY BE
TOO LATE

WAGNER SIGN SERVICE, INC.
356 S. Hoyne Avenue • Chicago 12, Illinois

Please send free data file on Induronamel® Safety Promotion.

NAME _____
COMPANY _____
STREET _____
CITY & STATE _____

39 DAYS
THINK
THE SAFE WAY
IS
THE BEST WAY

CIRCLE 80 ON READER CARD

Nerve Center for Multi-point Gas Detector

Model 520 Multitector provides a central control housing for multi-point monitoring of the presence and concentration of hazardous, combustible gases at varying locations. Detection is performed by sensing elements located at the desired points or areas and connected to the central unit by cables which can be up to 1500 feet long. Each detection point has its own measuring circuit, indicator and adjustable alarm and is referred to as a channel. Up to 5 channels may be supplied for any unit which encompasses a control power supply and audible alarm and is available in rack mounting or case enclosure.

Indication is read directly in terms of percent of lower explosion limit of the hazardous gas. Should the gas concentration exceed a safe value, both alarm and shut down circuitry is triggered.

All adjustments and calibration are made at the central panel. HOUSTON INSTRUMENT CO., Houston, Tex.

(Item 169)

PRODUCT LITERATURE

Available free from manufacturers, literature describing their safety products, and offering useful information on the care and use of safety products. To obtain, circle appropriate numbers on Reader Card.

Floor Brick

Complete illustrated information on brick floor installation featuring the preparation of corrosion-resistant and wear-resistant joints to reduce costly maintenance is included in Bulletin E-27b available from The MASTER BUILDERS Co., Cleveland 18, Ohio. Covered are money-saving procedures and techniques for proper installation of new brick floors and the repair of existing ones, using special, non-shrink grout.

For more details circle No. 200 on enclosed return postal card.

Fire Blanket

Bulletin No. 0408-22, available from Mine Safety Appliances Co., gives details on their fire blanket that is designed to snuff out flames quickly and completely from head to foot when clothing is afire. The 62 by 82-inch, compact wool, flameproofed blanket is packaged in a rugged, red-colored case designed for vertical attachment to a wall near danger points. A loop of fireproofed rope extends outside the case. In an emergency, the victim pulls the rope. This opens the metal case door and permits the pleated protective covering to move forward as the victim revolves, wrapping himself in the blanket.

For more details circle No. 201 on enclosed return postal card.

Automatic Fire Detectors

Literature is available on the gas powered automatic fire alarm system developed and manufactured by the Falcon Alarm Co., Inc., 243 Broad Street, Summit, N.J. Both the single station and the complete system of detectors are covered. Complete specifications are given along with a short description of operation.

For more details circle No. 202 on enclosed return postal card.

Welder's Helmets

A variety of welding helmets are illustrated and described in this leaflet available from Welsh Mfg. Co., 9 Magnolia St., Providence, R. I. The advantages of complete headgear adjustability and interchangeable front frames are detailed.

For more details circle No. 203 on enclosed return postal card.

Metals Fire Extinguishment

This 12-page bulletin describes properties, uses, and handling of the versatile chemical, Trimethoxyboroxine (TMB), has been issued by Callery Chemical Co. Callery, Pa. Covered in detail are the principal applications of TMB as a metals fire extinguishant; primary curing agent for epoxy resins; and as an agent for nitrogen removal from refinery feed stocks. Case histories are given on experimental fire extinguishment for zirconium sponge, magnesium chips, titanium sponge, and magnesium castings. Physical properties are listed along with storage, handling, and shipping information.

For more details circle No. 204 on enclosed return postal card.

Medicated Hand Lotion

Revlon Medicated Silicare is said to keep workmen's hands healthier 5 ways. It protects against industrial irritants by coating hands with a smooth, invisible, repellent-film. It contains 3 drugs that promote healing of minor cuts and abrasions. It soothes rough, calloused skin. It promotes easier cleaning by preventing grease, paints, inks and other industrial stains from becoming deeply imbedded in the skin. At the same time leaving no heavy, sticky film to interfere with normal dexterity or affect normal skin functions such as perspiration. Revlon ,666 Fifth Avenue, New York City 19, N.Y.

For more details circle No. 205 on enclosed return postal card.

"Can Photocells Do the Job For You?"

A industrial application leaflet containing a comprehensive report of typical production problems solved with electric eyes is now available. Included are photographs and sketches illustrating the various applications. Helpful data for production engineers, plant engineers, etc. that are seeking economical and dependable methods for detection, counting, control, etc. Photomation, Inc., 96 S. Washington Avenue, Bergenfield, N.J.

For more details circle No. 206 on enclosed return postal card.

Safety Shoes

A catalog featuring 16 different styles of their safety shoes is being offered by the Safety Wing Division of the Red Wing Shoe Company, Red Wing, Minnesota. Included are listings of 6", 8" boots, chukkas, pull-ons and dress oxfords. A complete line of on-the-job, off-the-job, safety shoes; all equipped with approved safety steel toes; all available in sizes and widths to fit everyone, even the most hard-to-fit.

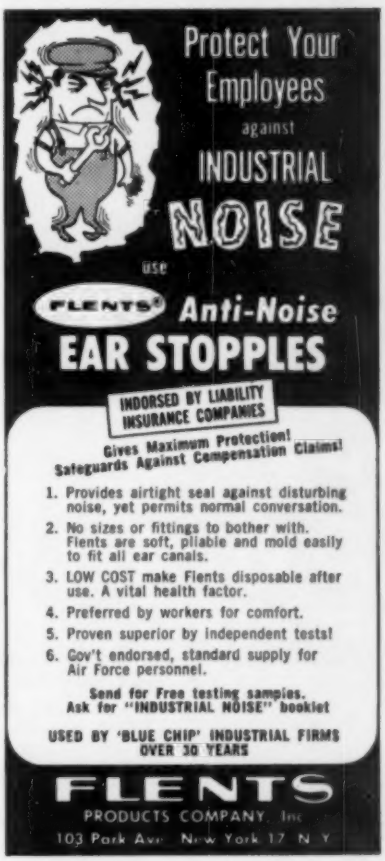
For more details circle No. 207 on enclosed return postal card.

Visitor's Goggles

Literature is now available on Pulmosan's new visitor's goggles. Lightweight and inexpensive. The frames and temples are made of smoke gray acetate. Spatula type temples are designed for comfort. Large clear acetate lens is equipped with clear nose pad for comfort without distortion. Pulmosan Safety Equipment Corp., 644 Pacific Street, Brooklyn 17, N.Y.

For more details circle No. 208 on enclosed return postal card.

CIRCLE 81 ON READER CARD


Protect Your Employees against INDUSTRIAL NOISE
use
FLENTS Anti-Noise
EAR STOPPLES
INDORSED BY LIABILITY INSURANCE COMPANIES
Gives Maximum Protection! Safeguards Against Compensation Claims!
1. Provides airtight seal against disturbing noise, yet permits normal conversation.
2. No sizes or fittings to bother with. Flents are soft, pliable and mold easily to fit all ear canals.
3. LOW COST make Flents disposable after use. A vital health factor.
4. Preferred by workers for comfort.
5. Proven superior by independent tests!
6. Gov't endorsed, standard supply for Air Force personnel.
Send for Free testing samples. Ask for "INDUSTRIAL NOISE" booklet
USED BY 'BLUE CHIP' INDUSTRIAL FIRMS OVER 30 YEARS
FLENTS
PRODUCTS COMPANY, Inc.
103 Park Ave. New York 17, N.Y.

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Haws Drinking Faucet Co. ..... *Eye-wash fountains*	56	85
Hy-Test Safety Shoe Div. ..... *Safety Shoes*	74	1
International Latex Corp. ..... *Cold packs*	37	69
Jackson Products ..... *Safety hats and caps*	23	57
Jomac Inc. ..... *Industrial work gloves*	11	45
Jones & Co. ..... *Visor goggles*	67	120
Junkin Safety Appliances ..... *Saf-sight shield*	71	122
Kennedy-Ingalls, Inc. ..... *Winter liners*	48	78
Kidde, Walter & Co., Inc. ..... *Fire extinguishing systems*	51	81
Kimberly-Clark Corp. ..... *Disposable wipers*	18	52
Macwhyte Wire Rope Co. ..... *Wire rope slings*	31	65
Master Lock Co. ..... *Padlocks*	14	48
McAn, Thom Safety Shoe Div. ..... *Safety Shoes*	15	49
Medical Supply Co. ..... *Folding stretcher*	73	123
Merrill Brothers ..... *Material handling devices*	16	50
Meyer Machine, Inc. ..... *High climbing safety clamps*	35	68
Mine Safety Appliance Co. ..... *Safety glasses*	26	60-61
Morrison-Pelsue Co. ..... *Linemen's hoist*	53	83
Morse Mfg. Co., Inc. ..... *Barrel lift*	49	78
Newark Ladder & Bracket Co., Inc. *Cable Scaffolding*	66	119
Patent Scaffolding Co., Inc. ..... *Industrial ladders*	34	67
Paulson Mfg. Corp. ..... *Eye protection*	32	66
Prairie State Products Co. ..... *Safety Signs*	62	115
Riegel Textile Corp. ..... *Work gloves*	28	63
Rochester Safety Equipment Co., Inc. ..... *Fan guards*	57	85
Rockwood Sprinkler Co., Portable Div. ..... *Fire truck equipment*	5	9
Rockwood Sprinkler Co., Pocketaire Div. ..... *Portable oxygen-breathing unit*	54	84
Rose Mfg. Co. ..... *Ladder shoes*	52	82
Safety Box Toe Co. ..... *Steel Toes for safety shoes*	1	I.F.C.
Sawyer-Tower, Inc. ..... *Safety clothing*	30,33 36,39	64,66 68,70
Scott Aviation Corp. ..... *Portable breathing equipment*	21	55
Scovill Mfg. Co. ..... *Snap fasteners*	25	41
Sillicone Paper Co. of America, Inc. ..... *Anti-slip coating*	8	15
Speedi-Dri Div. of Minerals & Chemicals Phillip Corp. ..... *Oil and grease absorbent*	9	42
Standard Signs, Inc. ..... *Safety signs*	60	88
Stimsonite Div. ..... *Warning lights*	17	51
Stonehouse Signs, Inc. ..... *Safety signs*	20	54
Surgical Mechanical Research, Inc. *Earstoppers*	55	84
Taylor, S. G. Chain Co., Inc. .... *Alloy slings*	79	127
Union Wire Rope Corp. ..... *Wire rope slings*	44	75
U. S. Borax Corp. ..... *Weed killer*	40	71
Wagner Sign Service, Inc. ..... *Safety signs*	80	128
Wilder Mfg. Co., Inc. ..... *Soldering iron holder*	43	74
Wilkins Co., Inc. ..... *Lens cleaning station*	64	117
Willison Products, Ray-O-Vac Co. . *Safety headgear*	4	6

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Here's a check list of types of information available quickly... free of charge

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The Advertisers' Index on the opposite page briefly describes products advertised and lists Key Numbers.

- **NEW SAFETY EQUIPMENT**

Check this special section for newly introduced or improved safety products and services that you want to know more about.

- **PRODUCT LITERATURE**

Following the New Safety Equipment Section you'll find a listing of catalogs, special reports, other printed material that is valuable as reference data.

IMPORTANT

Be sure to print your name, title, company and address legibly on Reader Card before mailing.

National **SAFETY NEWS**

Reader Service

Send now for free literature about the safety products and services in this issue.

You'll find Key Numbers throughout this issue. To get more information, just circle the Numbers of the products you're interested in on one of the Reader Cards below. Fill out the mailing information — detach the Card — and put it in the mail. Product literature will be sent to you free and without obligation by the manufacturer.

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AUGUST 1961
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1	16	31	46	61	76	91	106	121	136	151	166	181	196	211	226	241	256	271	286	301	316
2	17	32	47	62	77	92	107	122	137	152	167	182	197	212	227	242	257	272	287	302	317
3	18	33	48	63	78	93	108	123	138	153	168	183	198	213	228	243	258	273	288	303	318
4	19	34	49	64	79	94	109	124	139	154	169	184	199	214	229	244	259	274	289	304	319
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215	230	245	260	275	290	305	320
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216	231	246	261	276	291	306	321
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217	232	247	262	277	292	307	322
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218	233	248	263	278	293	308	323
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219	234	249	264	279	294	309	324
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220	235	250	265	280	295	310	325
11	26	41	56	71	86	101	116	131	146	161	176	191	206	221	236	251	266	281	296	311	326
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222	237	252	267	282	297	312	327
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223	238	253	268	283	298	313	328
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224	239	254	269	284	299	314	329
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330

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4	19	34	49	64	79	94	109	124	139	154	169	184	199	214	229	244	259	274	289	304	319
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215	230	245	260	275	290	305	320
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11	26	41	56	71	86	101	116	131	146	161	176	191	206	221	236	251	266	281	296	311	326
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222	237	252	267	282	297	312	327
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223	238	253	268	283	298	313	328
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224	239	254	269	284	299	314	329
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330

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Within the pages of National Safety News you'll find more safety products advertised than in any other safety magazine.

To get more information about any product advertised use one of the Reader Cards below. Just circle the Key Numbers of the products you'd like more information about and drop the Card into the mail —no postage necessary (if mailed in U.S.A.). Product literature sent free without obligation.

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MS-301 Printed in U.S.A.

IF YOU'VE BEEN WAITING FOR A RELIABLE A-B-C EXTINGUISHING AGENT

...and if you prefer cartridge-activated extinguishers, then "FORAY" was designed for you! "FORAY" is the name we've given the new Ansul line of dry chemical extinguishers for *all* classes of fire—and the A-B-C extinguishing agent itself. "FORAY" extinguishers are available in six popular models—10's, 20's and 30's in both *cartridge* and *stored pressure*. Cartridge operated units traditionally offer greater reliability, ease of recharge, ease of maintenance. They haven't been available in A-B-C models until now! But...some people like stored pressure, so they're also included in the "FORAY" line. Much as we'd like to sell you brand new listed and approved "FORAY" extinguishers, Ansul has not taken up the national pastime of obsoleting perfectly good products. We'll be happy to advise you on converting your present Ansul extinguishers to the equivalent of "FORAY" models. Low cost conversion kits are readily available. Write for more detailed information on "FORAY" extinguishers or call your local ANSUL MAN...he's listed in the "Yellow Pages."

ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN.

ANSUL

CIRCLE 2 ON READER CARD

"FORAY" extinguishers (both cartridge and stored pressure) carry these Underwriters Laboratories ratings: Model 10: 1A-16B:C, Model 20: 3A-20B:C, Model 30: 4A-20B:C

NEWS FROM AO

Vapor and Acid (No. 6111)

Liquid Oxygen and Nitrogen (No. 6220)

New Suits For Full Body Protection

Here are two new protective suits designed to guard against hazards of vapor and acids or liquid oxygen and nitrogen splash. Each is made of special nylon fabrics, with hoods cut to fit over safety caps and windows that give the wearer ample viewing area.

The yellow vapor-and-acid-proof model is one-piece construction, polyvinyl chloride coated nylon, with all stitched seams sealed inside and outside. Requires self-contained breathing apparatus. Special sleeve cuffs are designed to give a good seal with either molded surgical gloves or with supplied, heavy-duty coated fabric gloves. Suit can be fitted with air hoses for ventilation, is cut large enough for self-breathing apparatus.

The liquid oxygen-nitrogen suit is translucent white or green, specially-treated nylon fabric (patented). It consists of the coverall, hood, boots and fully-lined, dehydrated cowhide leather gloves. Material is static-resistant, flame-resistant and oil-free. This model is currently used by the Armed Forces and industrial ground service crews.

For full information on these or other special protective garments, contact your AO Safety Products Representative, or write for literature and prices.

Your Surest Protection . . . AO SURE-GUARD Clothing

American Optical

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